Southern Power & Industry

The Industrial and Power Journal of the South-Southwest

JA 61

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Water Treatment

Reference Guide and Buyer's Directory for the South-Southwest

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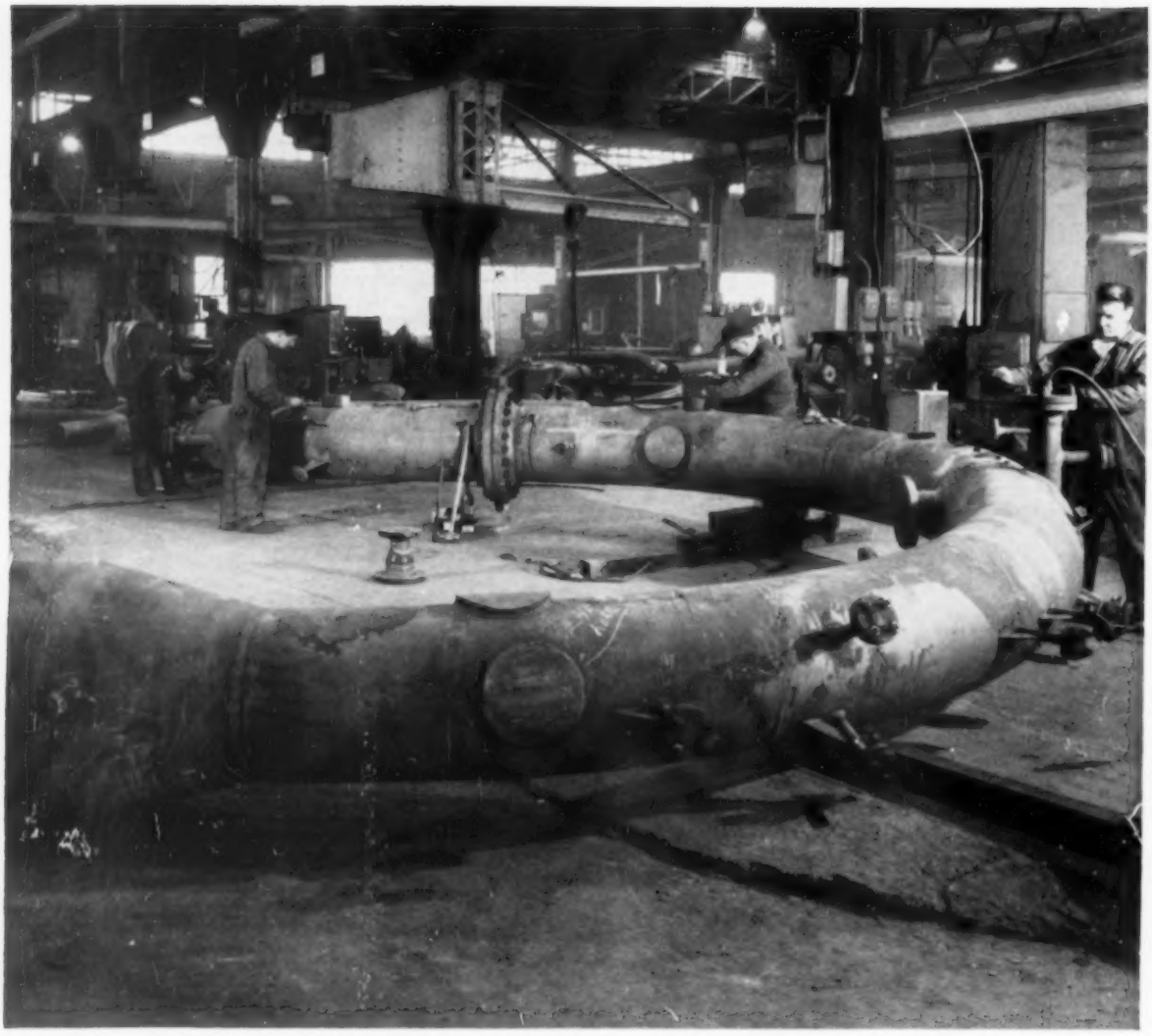
SPI



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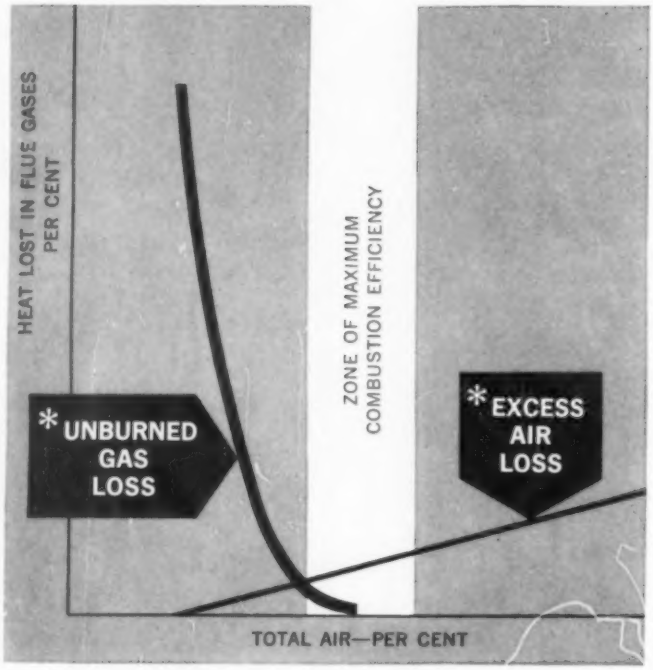
Volume 79 Number 1

You must know BOTH* to get maximum combustion efficiency!

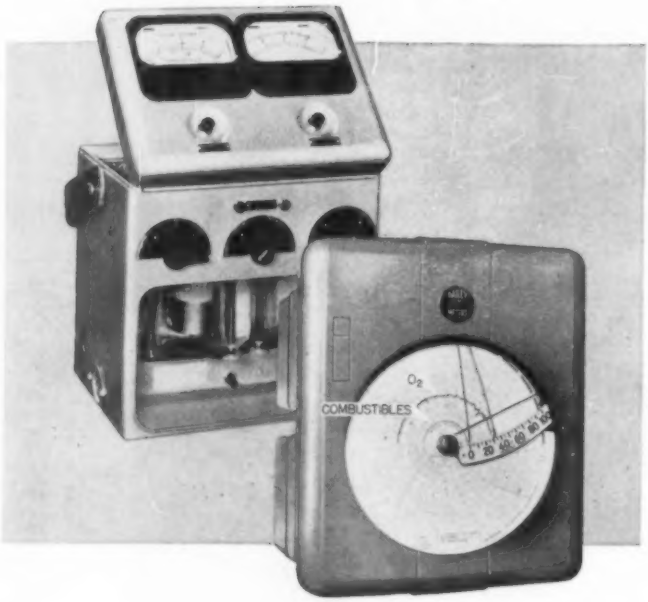

HEAT LOST IN FLUE GASES PER CENT
ZONE OF MAXIMUM COMBUSTION EFFICIENCY
* UNBURNED GAS LOSS
* EXCESS AIR LOSS
TOTAL AIR—PER CENT

How much money is going up the flue in *unburned fuel* losses? Is too much air resulting in excessive *heat* losses?

You must know *both* facts—simultaneously—to get optimum combustion. No instrument that measures only one of these interdependent factors can give you the full information you need.

Bailey offers a choice of two direct ways to maintain a continuous and simultaneous double check on these factors that determine combustion efficiency. The portable, lightweight Bailey HEAT PROVER Analyzer indicates both; the Bailey Oxygen-Combustibles Analyzer-Recorder records both on a single chart. Both instruments measure excess air, regardless of fuel or fuels being burned, and per cent of combustibles in flue gas.

Either of these Bailey instruments can save you far more than their cost in spotlighting combustion inefficiencies. Ask your Bailey engineer or write for product specifications.



2 DIRECT WAYS to measure both combustibles and oxygen simultaneously

PORTABLE INDICATOR—Self-contained, lightweight, Bailey HEAT PROVER Analyzer enables quick, easy check on combustion conditions. Dual range dials for greater accuracy and readability.

PERMANENT RECORDER—Bailey Oxygen-Combustibles Analyzer-Recorder coordinates both records on one chart . . . is designed for permanent installation . . . helps maintain optimum ratio continuously.

* Unburned gas loss and excess air loss.

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The Industrial and Power Journal of the South and Southwest

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Facts and Trends

January 1961

◆ UP IN THE AIR —Southern Airways set a new passengers-boarded record on November 23 by boarding 1,402 passengers, and then again on November 27, they set another record by boarding 1,444 passengers. Previous record was 1,394 passengers on May 27, 1960.

Southern has recently started service over three new routes in Tennessee and Alabama. Another new route commenced between Memphis and Meridian, Mississippi, on December 1 — offering direct service between these two points for the first time, as well as the first direct service from Meridian to Mobile, Alabama. Southern presently operates 23,500 route miles daily and in eleven and one-half years of operation has maintained a perfect safety record while carrying over 1,765,000 passengers.

◆ NO BUTTER-FINGERS — Automatic telephone dialing played a major role getting repair crews out in the recent Florida hurricane, according to E. O. Dunnam, assistant distribution supervisor for the Florida Power and Light Company at West Palm Beach.

He credited Dialaphone, the new revolutionary one-touch automatic telephone dialing instrument, with enabling him to contact repair crews in a hurry. As Dialaphone placed each call, Mr. Dunnam said he was able to perform other duties while each number was being dialed automatically.

◆ MORE LUMENS PER KW — The new line of high efficiency fluorescent lamps, "the most efficient ever produced commercially," has been expanded by the Westinghouse Lamp Division.

Four lamps are being added to the line, which previously included a 40-watt lamp and a 96-inch slimline. The new high efficiency fluorescent lamps provide 15 per cent more light than cool white lamps, and 36 per cent more than daylight type lamps, as the result of a new phosphor combination. Producing 3200 lumens compared to 2800 for ordinary 40-watt fluorescent lamps, the new product also has excellent light maintenance characteristics.

◆ WORKMEN'S COMPENSATION — The Chamber of Commerce of the United States has published a list of changes made recently in workmen's compensation laws in ten states: Alaska, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Nevada, New York, Rhode Island, and Virginia.

The changes are described in a special supplement to the Chamber's 1960 Analysis of Workmen's Compensation Laws. Persons who have not bought the Analysis can get it and the supplement by sending $1.00 to the Insurance Department, Chamber of Commerce of the United States, 1615 H St. N.W., Washington, D. C.

◆ HIGH HOURLY RATE — Engineers attending the annual ASME meeting in New York were told how a saving of one hour a day in the time a commercial jet liner spends on the ground can save an airline over three and one-half million dollars per year for each jet it owns. They were offered one solution to that problem, which could eventually save John Traveller a lot of money.

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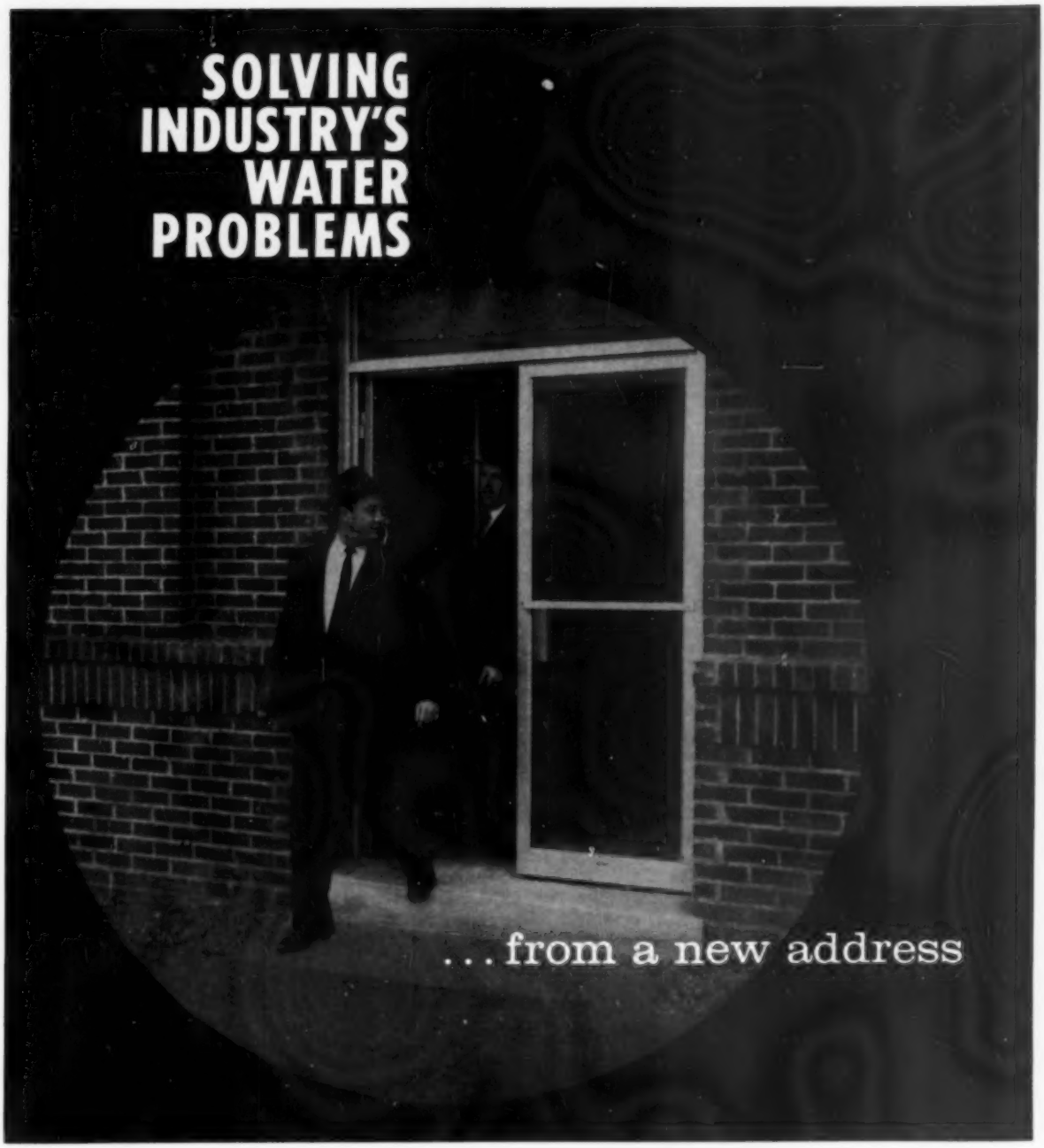
SOLVING INDUSTRY'S WATER PROBLEMS



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Facts and Trends (Continued)

◆ FUTURE FOR PAPER INDUSTRY — Making paper and paper products from Southern pine trees has become one of the most important industries in the Sixth Federal Reserve District. In terms of the difference between value of finished products and cost of materials used in manufacturing, the paper industry ranks third, exceeded only by chemicals and food manufacturing. In terms of growth since 1947, however, it holds second place, with the chemicals in the lead. The pulp and paper business in the Sixth District also exceeded the growth by its counterparts in other parts of the country.

When an industry captures the headlines by virtue of its growth record, questions often arise about its future. A study by the Federal Reserve Bank of Atlanta examines some factors that may help answer the question, "What lies ahead for the Southern pulp and paper industry?"

◆ HOW MUCH DOES THE FEDERAL GOVERNMENT REALLY OWE? At a dinner held by the Tax Foundation in New York, Maurice H. Stans, Director of the Budget, undertook to answer that question.

"Our present national debt of $290 billion doesn't include present Federal liabilities for past services in even greater amounts . . . Now the $290 billion of current public debt, plus $350 billion of future obligations for past services, plus $98 billion in C.O.D.'s adds to the almost incredible total of about $750 billion. That is the Federal Government's mortgage on America's future, beyond the regular annual costs of defense, welfare, and commerce."

◆ UP AGAIN — Wage increases becoming effective in 1961 under contracts now in force will average just over eight cents an hour, according to a survey by the Bureau of National Affairs, Inc.

These increases will exert a strong influence on 1961 wage negotiations, in many areas virtually establishing a settlement "floor." With this in mind, BNA has analyzed more than 1,900 increases coming due in 1961 to determine their size and the industries in which they occur. BNA points out, though, that many contracts calling for deferred wage increases also contain escalator clauses. If the government's consumer price index should rise next year, the total 1961 increase under such agreements could be several cents greater than the amount of the scheduled increase.

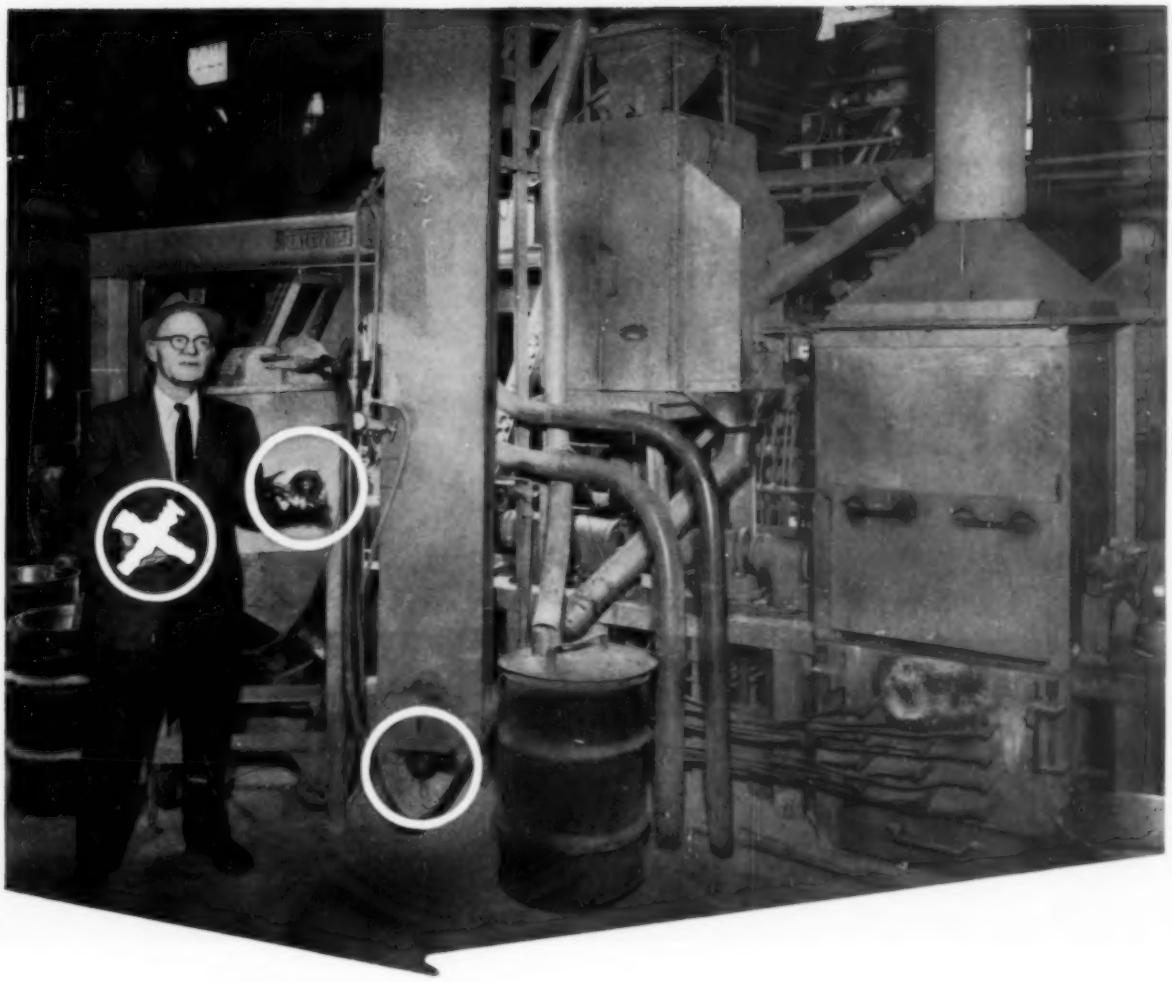
◆ HIGH TEMPERATURE — A new technical service which will deal with nickel alloys at elevated temperatures has been established in the Development and Research Division of the International Nickel Company, Inc.

This new High Temperature Engineering Section will serve industry on all problems arising in the use of materials in environments at elevated temperatures. It will develop and disseminate technical information, and be prepared to give advice on the selection of appropriate materials for high temperature applications.

◆ MORE THAN APPLES — The average total professional income of engineering teachers has increased by 14.7 per cent in the past two years, according to a report by the Engineering Manpower Commission of Engineers Joint Council.

Seventy-seven and one-half per cent of the average total income of engineering teachers is basic teaching salary and

(Continued on Page 9)



Dixie Bearings recommended a better seal, a better bearing and savings are $700.00 a year!

Here's a maintenance foreman who knew where to get help when bearings in his care failed prematurely. He called a Dixie Bearings engineer when the bearings in this bucket elevator conveyor failed after only two weeks of use.

The Dixie Bearings engineer found that the powdered zinc transmitted by the conveyor was responsible for the failure. Powdered zinc had worked through the bearing seal and since zinc joins itself when rubbed between two surfaces, being rubbed between the balls and bearing race led to a build-up that stopped the bearings in their tracks.

Analysis of loads and speeds showed a less expensive bearing would work well if its seal would shut out all dirt. The original bearings cost $16.79 each — the replacement only $7.36! This meant a net saving of $700 in bearing costs alone. Now in operation for two years the bearings have been replaced only once.

Dixie Bearings, Inc. sales engineers sell only products we are authorized to sell. No deals, no "just as good as" substitutes. Call the branch nearest you — The bearings you want are in stock ready for delivery.

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New colors match *Stylux-20* to the most modern factory . . . yet because of their rich, harmonizing tones, bring new life to older plants as well. Most important, panel color and light transmission characteristics are fully protected by the special *Stylux-20* formula for the entire period of the guarantee.

You can use *Stylux-20* in a variety of applications such as glazing, skylighting, sun shades, decorative partitions or translucent sidewalls . . . using it with complete confidence of full utility without repeated repair or replacement.

Well worth looking into. Specific details are yours for the asking. Use the convenient coupon, or write direct. Taking a few moments to examine *Stylux-20* in detail . . . may well be worth many dollars in return.

See New Stylux-20 Exhibit—Booth 654—Plant Maintenance & Engineering Show, Chicago, January 23-26.

Facts and Trends (Continued from Page 6)

the remainder is derived from outside professional work such as consulting and research. Since the survey was first made in 1956, average basic teaching salaries have risen 31.1 per cent and income from outside sources 11.3 per cent. Today's average basic teaching salary for engineering teachers in American colleges is $8,534. It is supplemented by an average of $2,479 from outside professional income.

◆ FARSIGHT — Scientists at the National Radio Astronomy Observatory in Green Bank, W. Va. — using a highly sensitive dish-shaped radio telescope, and electronic receiving equipment — are exploring and studying the universe. The distance in space, reached by the telescope, is at least one billion light years, or nearly six trillion billion miles!

The observatory and its 85-foot diameter radio telescope were designed and fabricated by Blaw-Knox Equipment Division employees. Each of the telescope's three legs — spaced 35 feet apart in a triangle — is anchored in 1,200 tons of concrete, 8 feet deep. The telescope operates with precision in winds up to 45 mph and will withstand velocities up to 120 mph.

◆ INERTIA? — The current vitality of the Western world's science and technology is sufficient to offset isolated advantages of a government-dominated system, according to a report recently issued by The American Society of Mechanical Engineers.

The report does not, however, attempt to gloss over unhealthy manifestations in private enterprise. It points out that engineers and technicians, often accustomed to doing a job in a particular way, need to be more alert to the use of improved products and techniques. The theme stressed is that "The best opportunity for reducing this time depends not entirely upon the scientists and engineers themselves, but upon management's ability to evaluate new scientific findings — and its willingness to take proper and prompt steps to do something about them."

◆ NEW POWER, NEW CONTROLS — Precise output control of unconventional electrical power sources will be studied by General Electric under a Navy contract. Equipment to be studied includes thermionic converters, thermoelectric generators and fuel cells — devices which convert heat or chemical energy directly into electricity.

Prompted by the growing need for smaller, more reliable, more precisely controlled power supplies, the study will be directed toward bringing together the techniques of unconventional power generation and the techniques of static power conversion and regulation for the development of optimized electrical systems.

◆ ISOLATED POWER — The National Bureau of Standards has employed General Instrument Corp. to design and fabricate a low-powered, propane-fueled thermoelectric generator system for evaluation as a power plant for the Navy's first unmanned ocean based automatic weather station, now beaming back vital weather information from 300 miles out in the middle of the Gulf of Mexico.

◆ EFFLUENT FOR IRRIGATION — Billions of gallons of water are now used in paper mills and then lost forever as they flow away. Under way more than a year, a pilot experiment has produced a stand of small slash pine that has grown with irrigation ranging from clear well water to 100 per cent black liquor.

(Continued on Page 10)

Facts and Trends (Continued)

Central Louisiana Electric Co., the U. S. Forest Service, Calcasieu Paper Co., International Paper Co., and Roy O. Martin Lumber Co. have undertaken an enlarged experiment to test use of effluent for irrigation. Success offers the potential of increased pine growth and seed production, solution to effluent disposal problems, replenishment of underground water reservoirs, and the use of effluent for other irrigational purposes, such as pastures and crops.

◆ NODULAR CAST IRON — A technical paper on properties of Nodular Cast Iron and its advantages as a material for control valve body construction discusses its chemical and mechanical properties and its performance when subjected to high and low temperatures, corrosion, thermal shock and welding conditions.

Heat treatment, machineability, strength, impact resistance, and fatigue resistance are also covered. The physical properties and their comparison with cast iron and steel are given in tabular form. Copies are available without charge from Fisher Governor Company.

◆ MOLTEN SALT REACTOR — The Atomic Energy Commission will build a reactor experiment of the molten salt type at the Oak Ridge (Tennessee) National Laboratory.

The major objectives are to demonstrate the dependability, serviceability and safety of the molten salt reactor concept for civilian power purposes, and to confirm earlier experimental work and information on components needed for a larger reactor. The molten salt reactor concept offers the advantages of improved steam conditions and high efficiency through operation at very high temperatures. Since the fuel is in solution, no fabrication of fuel elements is necessary and continuous removal of fission poisons is possible.

◆ POLITICAL PLANNING — Speaking of voting, Arthur H. Motley, National Chamber President and publisher of Parade magazine, said in a recent speech that businessmen and other citizens should participate in politics beyond merely casting their ballots every two years. "Politics ought to be the part-time occupation of every good citizen. Too many people forget that politics is a year-round business. We should take a clue from professional politicians who already are thinking in terms of what they must do to lay the groundwork for 1962 and even 1964."

◆ REPRINTS AVAILABLE — Write the editors of SPI for small quantities of the following at no charge:

SEGCO 1,000,000 KW PLANT — A 16-page folder describing this large new Alabama plant, serving Alabama Power Co. and Georgia Power Co., is a combination of two technical articles from SPI's September and November issues.

HOW EPOXY CAN SERVE YOU — 4 pages. Tells exactly how 10 separate repair jobs were handled and describes several epoxy mixes that are good for maintenance jobs.

ORIFICE METER INSTALLATIONS — Tells what the plant man needs to know about installation to get accurate, dependable service.

INSPECTION REPORTS — Tells how the station chemist can maintain information on the condition of boilers, cooling towers, condensers, heat exchangers, tanks and softeners. Actual inspection sheets are presented.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 8, Ga.

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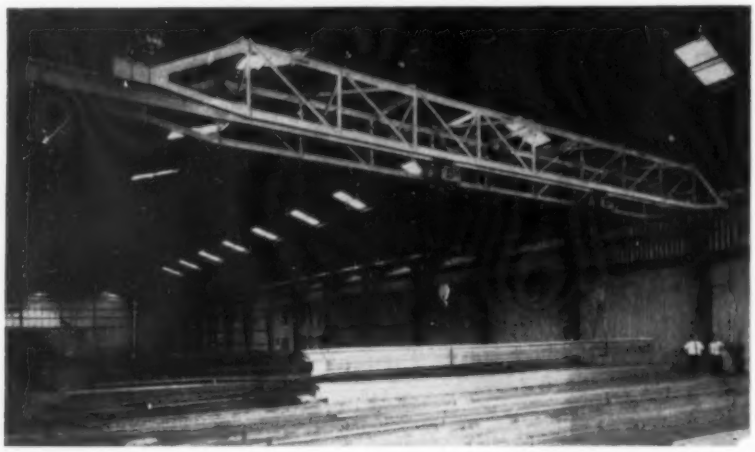


New Alabama Warehouse for Atlantic Steel Co.

Atlantic Steel's Warehouse Division has recently completed a major expansion of its **Birmingham** steel service center. A new warehouse building, 80 feet wide by 360 feet long, has been constructed on the company's property at 4230 First Avenue, South.

The new building adjoins the Warehouse Division's original facilities, built in 1957, and more than triples the available storage space. According to Birmingham branch manager Robert S. Peckham, "the enlarged area enables us to carry a much larger and diversified stock of steel and aluminum products. We can now give 'off-the-shelf' service to our metalworking customers."

The building is one of the Atlanta-based firm's own line of Dixisteel Rigid Frame Buildings. It is equipped with an overhead crane, and with standard warehouse cutting equipment.

The Birmingham branch stocks carbon and stainless steels, as well as the Olin line of aluminum products.

Robertshaw-Fulton Plans New Building at Richmond

The Robertshaw-Fulton Controls Company has purchased six acres in suburban Richmond, Va., on which it will build a two-story structure to house its corporate headquarters. The tract is bordered on the west by Byrd Avenue, and on the south by Fitzhugh Avenue.

Baskervill & Son, Richmond architects, have been retained to design a building which will more than double the working area presently leased by the company in downtown Richmond.

The proposed new building is to be of modern design, making liberal use of aluminum and glass with a brick trim. It is expected to provide approximately 35,000 square feet of office space. Construction is expected to start in the late spring or early summer of 1961, and to be ready for occupancy approximately a year later.

Diamond Alkali Plant Expansion — Texas

The multi-million dollar **Diamond Alkali Company** acetylene plant to be constructed at Deer Park, Texas, is expected to be completed late in 1961. The plant will supply all acetylene required for the manufacture of Diamond's polyvinyl chloride plastics at its Deer Park installation.

The new acetylene plant will be based on a process developed by Montecatini, a leading Italian chemical company with headquarters in Milan.

PLANT PERSONNEL

William F. Kiefer has been named manager of the new plant being built by Corning Glass Works at Danville, Va., and **John R. Freeman** has been appointed production superintendent.

Gerald W. Avery, a graduate of Texas A&M College and Columbia University, has joined the Chemstrand Corporation's Acrilan acrylic fiber plant at Decatur, Ala., as process improvement engineer.

Thurman E. Brown succeeds **Dr. C. J. Sindlinger** as director of development for Columbia-Southern Chemical Corporation's research and development laboratory at Corpus Christi, Texas.

R. J. Woodford, formerly production superintendent at The Goodyear Tire & Rubber Company's Gadsden, Ala., plant, recently became manager of interplant relations at the Akron headquarters.

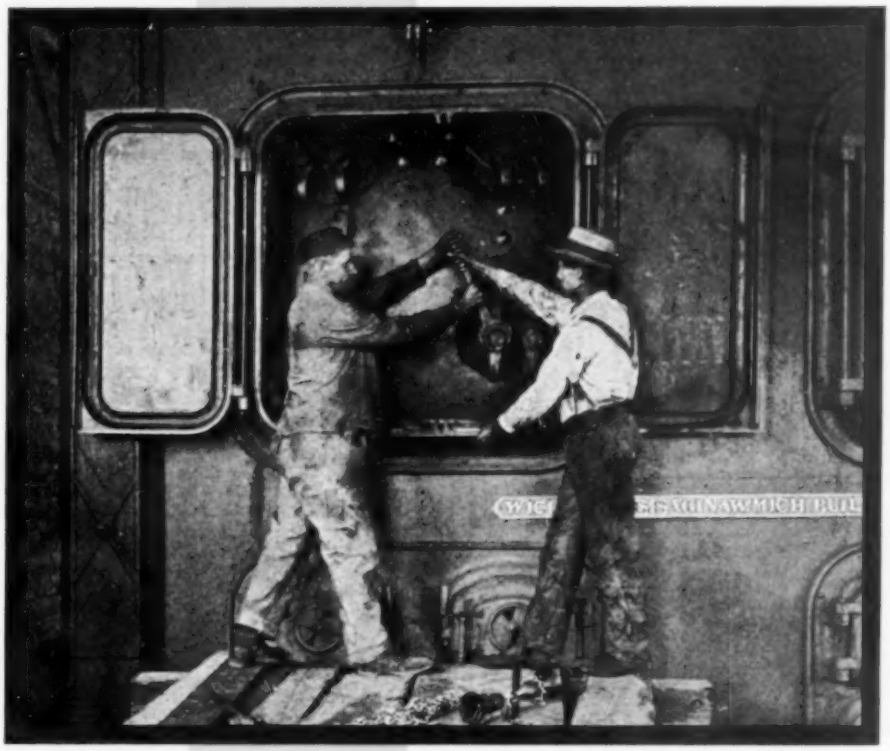
Included in key personnel at the new Owens-Corning Fiberglas Corporation plant in Aiken, S. C., are: **Richard MacPherson,** plant manager; **Eugene M. Lockhart,** production manager; **John F. Coplin,** operations planning manager; **L. J. Shafer,** plant engineering manager; and **Douglas E. Potter,** technical control manager. **Bonner Manly** is personnel director, and **Jerry B. Holschlag** is project engineer.

Karl O. Elderkin of Athens, Tenn., who recently retired as president of Bowaters Engineering and Development Incorporated, has been replaced in that capacity at Calhoun by **George Hobbs,** former mill manager of Bowater's Newfoundland operation.

Georgia Engineer Honored

John J. McDonough, president of the Georgia Power Company, has been named the Georgia Engineer of the Year by the **Georgia Society of Professional Engineers.** The Society also has nominated Mr. McDonough as its candidate for engineer of the year of the National Society of Professional Engineers for 1961.

(*Continued on page* 47)

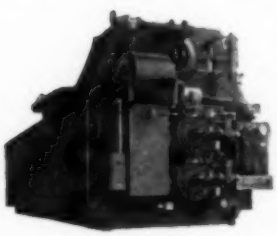


This boiler, built by Wickes Boiler Co. in 1875, operated satisfactorily for the next 31 years.

When buying modern Boiler Equipment it pays to deal with an *EXPERIENCED MANUFACTURER*

There is no substitute for experience. From the first pioneering days in boiler manufacture, years before the boiler pictured above was built, Wickes Boiler Co. has continued to be a world leader in the development of economical, efficient and dependable steam generators. Today, Wickes builds steam generators in sizes to 500,000 lbs. of steam per hour, for high or low steam pressures and temperatures and for all types of fuels and firing methods.

A Wickes steam generator, custom engineered to exact generating requirements, is built to the highest standards of workmanship, backed by over a century of boiler making experience.



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INDUSTRY SPEAKS

Quit Parroting Pink Slogans

ARTHUR V. WIEBEL, president of U. S. Steel's Tennessee Coal & Iron Division, speaking at a meeting of the Southern Newspaper Publishers Association in Boca Raton, Florida, said in part:

"**A GREAT MANY PEOPLE** are going to have to revise and reshape their attitudes in order for the South to achieve the economic advancement of which it is potentially capable. The South is already on the upward slopes of a mountain of prosperity, but divisive influences are slowing the advance.

"Today the South faces many barriers as it climbs its mountain of prosperity. There are forces which divide our people and tend to divert them from the goal of a better life for all. There are suspicions, resentments and narrow appeals to self-interest and group interest which distract us and slow our forward march.

"There are those, within and without the South, who for their own special purposes would capitalize on the divisive influences which beset us. They would pit class against class, interest against interest, man against man."

Lashing out at those who "confuse yesterday's misfortunes with today's reality . . . use the past to counterfeit the present and circumscribe the future," Mr. Wiebel said he was out of patience with professional detractors of the South who bid for public attention by picturing the region as backward and benighted. He said he was sick of sensational writers who write repetitiously and redundantly of decadence under the magnolias, and fed to the teeth with would-be Southern intellectuals who curry favor with the South's critics by parroting the pink slogans and catchwords of a degenerate philosophy.

The South's newspaper people can do more than anyone else to correct attitudes which are slowing the progress of the South, Mr. Wiebel said. Declaring that there is greater need for pride than self-pity and more reason for hope than regret, he called upon the publishers to take a positive approach toward helping the South reach the peak of its mountain of prosperity.

"Despite the handicaps under which it has labored, the South has made truly phenomenal strides in recent years, and the region is going to set the pace for the world in industrial and economic growth.

"It is being proved every day that we have what it takes to become a first-rate industrial section. It is being demonstrated that our businessmen have the know-how and the judgment to establish an industrial enterprise and to operate it efficiently and successfully. The misconception that Southerners lack the energy and adaptability to become good industrial employees is being consigned to well-deserved obscurity.

"Quite to the contrary, Northern manufacturers opening branch plants here have many times testified that Southern workmen can be trained with relative ease, that they are eager and willing workers and in many cases are more stable and more loyal to their employers than are working people in other sections.

"Employment in Southern manufacturing plants has risen 30 per cent in a 10-year period. Many of the states which comprise the broad Southern region are leading the nation as a whole in the rate of post-war growth, and in only four of 34 fields of industrial and commercial activity did the average gain for the South fall below that of the nation.

"In the period from 1947 to 1958 the South far outstripped the nation as a whole in many facets of business growth: in value added by manufacture, in the number of new manufacturing plants established, in manufacturing pay rolls. And the number of people employed in manufacturing plants went up more than twice as fast as did the number added to industrial production throughout the nation. Increases in per capita income, in retail sales and in bank deposits also outstripped those for all of the United States.

"Thirty-nine per cent of the chemical industry and 80 per cent of the petrochemical industry are located in the South. Almost three-fourths of the synthetic rubber and nearly all of the man-made fibers are produced here. There are more than 200 electronics plants in the South, employing almost 100,000 people.

"This generation has advanced far beyond the dreams of the one which preceded it, and the next generation can far outstrip anything which has been achieved by our contemporaries."

TIMELY COMMENTS

Industrial Use of Radioisotopes

H-BOMBS MAY be the most spectacular side of the atomic energy picture, but a more pleasant part of nuclear energy is producing greater public benefits.

So indicated Paul C. Aebersold, the Director of Isotopes Development for the United States Atomic Energy Commission, in a recent speech at the Winter Annual Meeting of ASME. He told his audience that radioisotopes (radioactive forms of different chemicals, often man-made) are truly the success story of atomic energy.

Small amounts of radioisotopes can be put into liquids and used as tracer atoms. Use of radioisotopes in testing wear on engines or other machines gives information in a few hours that otherwise could not be found in months of operation. One railroad saved 14 million dollars over a few years by proving through radioisotope tests that cheaper fuel could be used economically in its locomotives.

Some pipe lines may contain as many as twenty batches of different products, each many miles long, flowing to market. By putting a small amount of radioisotopes in at the pumping station just at the moment a new product starts through the line, the interface can be detected by Geiger counters outside the pipe and each product diverted to its proper tank, even though pumping station and switching station may be hundreds of miles apart. Leaks in oil and water lines and gas pipes can also be found through tracers.

Another way in which radioisotopes can be used is by measuring reflection and intensity of radiation within materials. Since both properties vary with different materials, contents of packages and cans can be inspected in this way. One firm which manufactures boilers finds it can check them for flaws through radiation measurement at an annual saving of $100,000 over x-ray machines.

More and more manufacturers recognize that customer satisfaction can be assured through an inexpensive testing method, and radioisotope gages have sharply reduced deviation in many products such as: tire fabrics, paper, metal strips, battery separators, soda crackers and adhesive tape. Greater uniformity results in improved product performance and consumer satisfaction.

Realizing that radiation in large amounts has the ability to affect material, manufacturers are now employing radioisotopes purposely in this way to improve certain qualities in products. They can also be used more safely than radium to illuminate watch dials and instrument panels and are used to prevent static electricity in the air, to supply power to small electric circuits in missiles and satellites, small radios and hearing aids.

Future uses of radioisotopes may include employment in plastics fabrication to give resistance to high temperatures and chemical agents like detergents, oils, acids and alcohols.

Sterilization of pharmaceutical products and hospital supplies is an exceptionally promising use of radiation. Radiation gives complete sterilization of tightly-packed containers and may possibly eliminate expensive handling procedures currently used.

And in still another area, since radiation can kill bacteria in meat, fish, poultry and other foods, can stop potatoes or onions from sprouting and can stop the reproduction and growth of insects which infest foods, much interest has been shown in radiation as a new food-processing agent. Extensive tests are under way to find out the effects of radiation processing on those who eat the food.

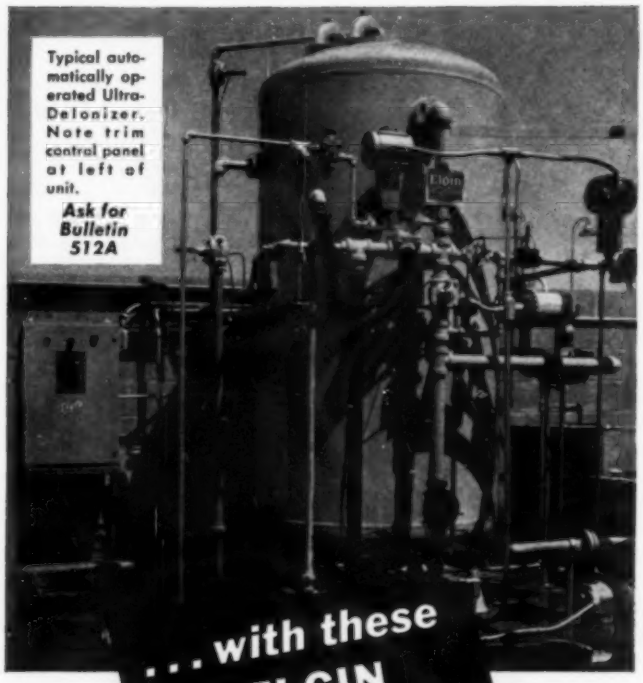
As to safety of people and products, radioisotopes are among the safest tools that one can envision. It is likely that radioisotopes will improve the total accident and workmen's compensation record.

In general, however, industry has been slow in putting radioisotopes to use. This may be due to the relatively few trained scientists, engineers and technicians that industry can draw on to expand radioisotopic applications, lack of familiarity, or inertia in using these new industrial tools, and the fact that, in many cases, the necessary technology has not yet been fully developed.

A partial remedy to this situation was suggested at the same session of the ASME meeting by Paul J. Blaetus, chief of Isotopes Technology Training Branch of the Office of Isotopes Development.

Mr. Blaetus described the AEC's Isotope Technology Program, which is designed to assure the availability of trained personnel—both today and tomorrow—for the full exploitation of radiation techniques. A basic course in techniques is given at the Oak Ridge Institute of Nuclear Studies in Tennessee, lasting from two to six weeks, depending on individual interest and training.

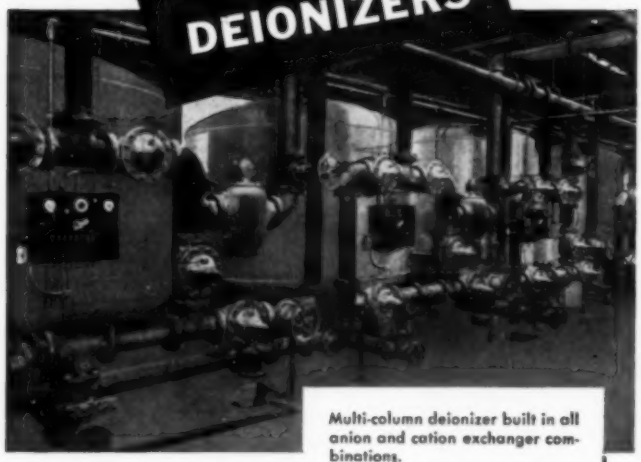
MINERAL-FREE WATER



Typical automatically operated Ultra-DeIonizer. Note trim control panel at left of unit.

Ask for Bulletin 512A

...with these ELGIN DEIONIZERS



Multi-column deionizer built in all anion and cation exchanger combinations.

Ask for Bulletin H4

—from equivalent of distilled up to 18,000,000 ohm quality

Whatever the quality of water you need—even up to 18,000,000 ohm purity—Elgin can supply the correct type and size deionizer to deliver it. Standard mixed-bed Elgin Ultra-DeIonizers are capable of producing water having an average of less than 0.5 ppm total ionizable solids, a specific resistance averaging in excess of 1,000,000 ohms and free of silica and CO_2. Employing special ion exchange materials, Ultra-DeIonizers are also built to deliver water of up to 18,000,000 ohm quality.

Elgin multi-column deionizers in various anion and cation exchanger combinations, both with and without degasification and mixed-bed "scavenger" units, are also widely used to provide water of any chemical purity desired.

While all Elgin deionizers are available in standard models, most buyers choose the exclusive Elgin "Double Check" type because its ingenious manifold arrangement (1) guards against loss of valuable ion exchange material (2) permits a deeper demineralizing bed (3) allows more effective backwashing (4) increases regeneration efficiency. This all adds up to a marked increase in high quality water output.

Whether for makeup purposes or processing requirements, chemically pure water delivered by an Elgin Deionizer costs so little considering the big job it does. And from simple manual control to fully automatic operation, you can rely on Elgin equipment to give that uncompromising quality and trustworthy service for which Elgin has been known more than a half century.

The technical assistance of the nearest Elgin representative is as close to you as your phone. Call or write for information.

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WASTE TREATMENT—Experience Report

By JOHN L. BROWN, JR.
Sanitary Engineer
Cannon Mills Company
Kannapolis, N. C.

THE PROBLEM of waste treatment was neglected by industry for many years. This basic policy was in effect because there were no federal or state laws concerning pollution of streams except where the public health was involved.

Wastes from many plants were dumped directly into streams and dilution provided the only treatment. On small streams where the dilution was not adequate damage fees were frequently paid to property owners adjacent to the streams. In some cases water rights were purchased on these small streams in order to permanently remedy the damage. This method of disposal was generally considered satisfactory from both the legal and public standpoint.

Regulations Adopted

The tremendous growth of our country and increased demand for water gradually changed the picture. We now have a federal law controlling stream pollution. This law leaves the power of enforcement to the states, but in cases where a state does not assume the responsibility, the federal government has authority to issue corrective orders.

Most states have now adopted laws on pollution control and many of them have very effective programs today. North Carolina adopted its pollution control law in 1951 and has had excellent administration of the law.

After the passage of the North Carolina law the management of the author's company realized that a new policy on waste treatment was necessary. It was decided that full cooperation with the state enforcement agency and voluntary abatement of pollution was the best policy.

With the adoption of the new policy our next problem was what to do about it.

Information on treatment of textile wastes was available, but all methods were very expensive and did not completely solve our problem. We then decided that a complete study of our individual waste problem was necessary and embarked on this program in the spring of 1952. This study continued for a period of two years and our present method of waste treatment is based on the results of this study.

Types of Wastes

The waste being treated at Kannapolis consists of domestic sewage from the mills and mill village and certain selected wastes from the bleachery and slasher rooms.

A brief description of the waste produced in our bleachery and dye house will be helpful and will indicate why we treat only a selected part of our industrial waste.

The wastes from the bleachery are derived from continuous peroxide-bleaching ranges. The first two steps in this process produce the troublesome wastes.

The first step is the desizing operation and the waste produced is chiefly starch. This waste has a very high *biochemical oxygen demand* (BOD) and is slightly acid. It ferments rapidly and cannot be stored for any great length of time.

The second step is the cleaning operation in which a 3 per cent caustic solution is the chief cleaning agent. This waste also has a high BOD and is very highly alkaline. However, it is very stable and can be stored for long periods. This storage is also beneficial in the treatment since most of the hydroxide alkalinity is reduced to

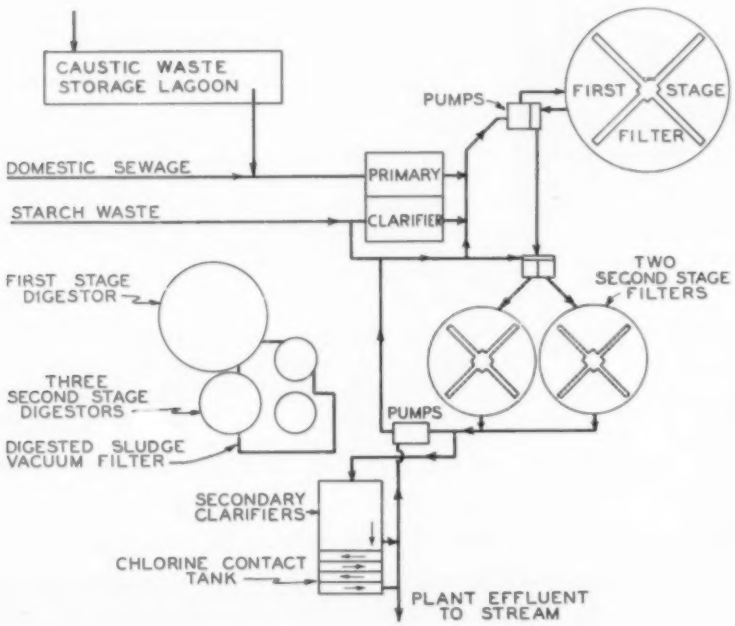
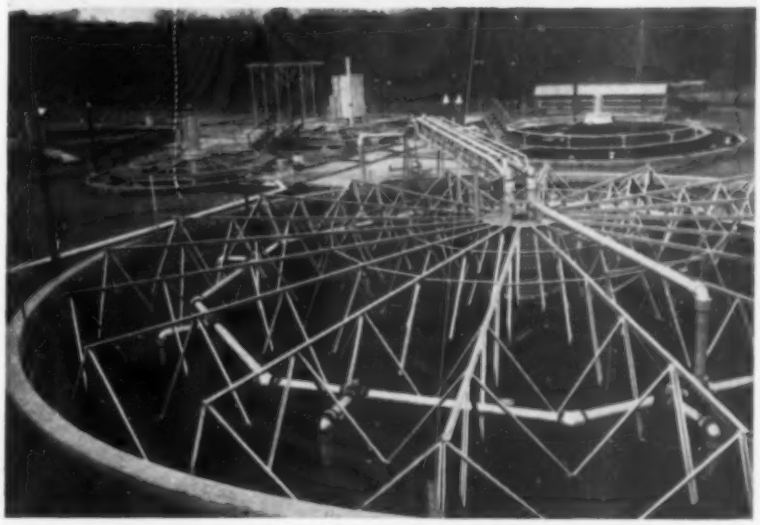


Fig. 1. Schematic flow diagram of Cannon Mills waste treatment plant, Kannapolis, N. C.

Fig. 2. Caustic storage lagoon.

Fig. 3. Primary tanks, first stage filter, and second stage filter.

Fig. 4. Primary digestor and three secondary digestors. Raw water goes to primary digestor, where gases are drawn off. Digested sludge is drawn from the secondary digestors.



the carbonate or bicarbonate during the storage period.

The third step is the bleaching operation in which peroxide is the bleaching agent. The waste produced is harmless from a pollution standpoint.

The other operations in the bleachery produce very limited amounts of waste and are of little importance in so far as pollution is concerned. The wastes produced by the dye house are also of minor importance except for color in regard to downstream pollution.

Cannon Mills produces in the range of 20,000-30,000 pounds of BOD per day in plant. The approximate cost of removing 1,000 pounds of BOD in this instance is about $20.00. The approximate cost per million gallons treated in the summer months is $30.00 for labor, power, and chemicals.

Certain soaps and detergents present less trouble and produce less BOD than others. Cannon Mills personnel examine all products used in dyeing and finishing operations with BOD in mind in considering the pollution problem.

The results of the 2-year study on our waste showed that 90 per cent of the total BOD being discharged was in the wastes from the first two steps in our bleachery. These same two wastes contained 66 per cent of the total alkalinity being released. The volume of these two wastes represented only 35 per cent of the total waste being discharged.

It was decided, with the approval of the Stream Sanitation Committee, to concentrate our efforts on these two wastes. We felt that if these wastes could be treated successfully, the receiving stream would be greatly improved. The remaining wastes would be by-

passed for the present and the size of the treatment plant could be reduced. The treatment plant could be enlarged in the future to treat all of the waste if we were successful in this phase of the treatment.

Laboratory Studies

Laboratory studies indicated that biological treatment of these two selected wastes in conjunction with domestic sewage was possible. We decided to use the existing domestic sewage plant to determine on a plant scale just what effect these wastes would have on the operation of the plant.

Connections were made to the domestic sewer system from the drains on several units in the bleacher. The sewage-treatment plant was operated for a number of months on various combinations of wastes. The final treatment method evolved from these trial operations.

From this plant-scale operation it was evident that the best treatment could be effected if the wastes were segregated at the bleachery and then transported to the treatment plant in separate pipe lines. The starch waste was to be treated immediately on arrival at the plant. The caustic waste was to be stored in a lagoon and treated on a 7-day basis. The caustic would then give us a means of continuous pH control. High pH was necessary in order to retard the fermentation of the starch wastes.

Treatment Plant

The waste-treatment plant in operation at Kannapolis consists of the following units: A caustic storage lagoon, primary clarifiers, trickling filters, secondary clarifiers, chlorine contact tank, sludge digesters, and vacuum filtration of sludge.

The waste-treatment plant was designed and built by the Engineering Department of the author's company. It was completed in June 1956 and has been in operation since that date. During the past three years we have made three important changes in our treatment plant that have greatly improved the efficiency of the plant.

The first two changes made concerned the primary clarifiers. In the original design all wastes were combined ahead of the clarifiers and all wastes settled together. After several months of operation it was evident that the caustic was affecting the settling of the combined wastes to a greater degree than anticipated.

Suspended solids that should have been removed in the primary clarifiers were being dissolved by the caustic and were passing on to the first-stage filter. This increased the biological loading to the filter and the remaining units in the plant.

The inlet arrangement to the primary clarifiers was redesigned and separation of the wastes was carried through the primary clarifiers.

It also was found that more effective settling could be obtained if the starch waste was coagulated with lime.

These two changes in the primary-clarifier operation reduced the biological loading to the filters and resulted in a more efficient operation of the plant.

The third major change was in the ventilating system for the first-stage filter. During the summer of 1957 an odor problem developed in this filter and for several months we were unable to determine the cause. Inadequate ventilation was finally suspected and recording thermometers were installed to determine the temperature of the filter effluent and the atmosphere.

We found that the temperature of the waste and the atmosphere were relatively the same for about 60 per cent of the average summer day. This retarded natural ventilation during the daylight hours and caused a depletion of dissolved oxygen in the waste as it passed through the first-stage filter.

Anerobic conditions in the bottom of the filter had resulted in a biological growth that produced very foul odors. These odors accumulated in the filter throughout the period of poor ventilation and were exhausted in the late afternoon and early night hours.

When adequate natural ventilation was reestablished in the early morning hours and on the week ends no odor was evident.

This condition was corrected by installing four ventilating fans to provide forced ventilation. The best operation has been obtained with the fans blowing into the under-drain system of the filter. The efficiency of the filter in reference to BOD removal was also improved by this installation.

Ventilating fans were installed on the secondary filters at a later date and have also improved their operation.

Table 1 Average Results

	January	August
Average pH to plant	11.5	11.4
Average BOD to plant, ppm	1600	1390
Per cent removal of BOD	81.2	95.3
Per cent removal of Settleable Solids	96.0	98.3

Odor Problems

Odor problems have developed in the filters at times from various other causes. Several odor-masking chemicals and sprays have been used in an endeavor to control this problem. Some of them have been helpful from the odor viewpoint. However, several of them have actually been harmful to the biological life in the filters.

We are considering a dome-type structure to enclose the filters completely. The exhaust air and gases from the filter would then be burned with the waste gas from the digesters and put through a stack.

There is a filter in Sarasota, Fla., with such an arrangement and it apparently has corrected the problem. The advantages of an arrangement such as this would be threefold. It would control all odors, confine all psychoda flies and maintain higher winter temperatures. *An article on the Sarasota installation appeared in the Sept. 1959 issue of Southern Power & Industry.*

Operating Results

The operating results of the Kannapolis plant are very satisfactory. Averages for a winter and

(*Continued on page* 44)

DEIONIZERS

ION EXCHANGERS

DEALKALIZERS

WATER SOFTENERS

WATER TREATMENT

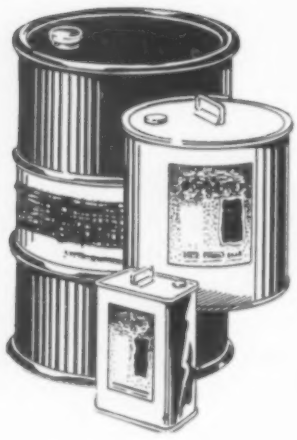
DEAERATING HEATERS

AERATORS

FILTERS and PURIFIERS

WATER TREATING CHEMICALS

Water Treatment



Reference Guide and Buyer's Directory for the South-Southwest

M-1—Feedwater Treatment — Bulletin WH-500, 4 pages, describes Braxon (trade name for various liquid formulas) and Flako (trade name for various dry formulas), both based on phosphate or carbonate control, for boiler feedwater treatment. — ANDERSON CHEMICAL COMPANY.

M-2 — Air Washers — Bulletin, 2 pages, outlines features of Lintoff G-36 and Kleenaire approach to complete water treatment in air washers and humidifiers for corrosion control, lint removal, slime elimination, and sanitation. — IPCO LABORATORIES, INC.

M-3—Treatment Chemicals — Bulletins offered by manufacturer and distributor of Permutit water treatment chemicals include: Bulletin CS-105, Wisprofloc-20 Coagulant Aid; Bulletin CS-111, Neutralizing Amines; and Bulletin CS-110, Permutit Briquet System. — IONAC CHEMICAL COMPANY.

M-4—Brine — Bulletin, "The Lixate Process," 34 pages, discusses a system for making and handling better brine at lower cost for today's industry. Photographs and charts show adaptability to various types of plants. — INTERNATIONAL SALT COMPANY, INC.

M-5 — Treating Plant — Bulletin 1825-D, 28 pages, is a study of the chemical and hydraulic principles involved in the "Accelator" treating plant. Contains resume of design and operation experience in units now in service. — INFILCO INCORPORATED.

M-6 — De-Ionization — Condensed Catalog B-460, 4 pages, gives brief descriptions and photographs of major items in de-ionization processes and equipment. — ILLINOIS WATER TREATMENT COMPANY.

M-7—Boiler Sludge Control — Bulletin 28B7408 — Explains Akon feedwater treatment for control of boiler sludges where dispersive agents fail or lose their original effectiveness. Illustrated. — ALLIS-CHALMERS MFG. CO.

M-8—External Regeneration—Technical Reprint T-182, 12 pages, discusses many phases of "The Place of External Regeneration in the Design of High-Rate Condensate Scavenging Systems." — GRAVER WATER CONDITIONING CO.

M-9—Corrosion Elimination — Alkasteem & Ox-Gem Bulletin, 4 pages, explains how Alkasteem neutralizes carbon dioxide and how Ox-Gem reacts with oxygen in boiler water to stop corrosion. — ANDERSON CHEMICAL COMPANY.

M-10—Chlorine Solution — Catalog 70-22, 4 pages, presents panel mounted systems of piping and valves for regulating the distribution of one or two incoming flows of chlorine solution to one or several outlet lines.—FISCHER & PORTER CO.

M-11—Plastic Valve—Bulletin V-159, 4 pages, outlines construction details and other features of Illco-Matic pneumatic all-plastic valves for all types of liquid-handling equipment. — ILLINOIS WATER TREATMENT COMPANY.

M-12 — Demineralizers — Bulletin 108-B, 8 pages, introduces quality controlled demineralizers designed to meet industry's needs for chemically free water. Lists related products and engineering facilities. — L°A WATER CONDITIONING, INC.

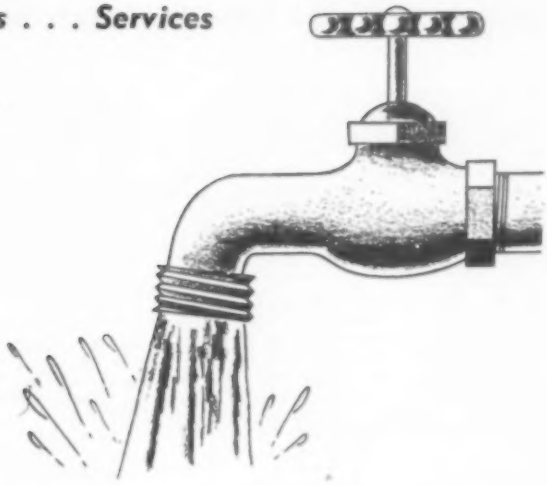
M-13—Chemical Feeding — Tech. Bulletin No. 202, 4 pages, illustrates and describes the Ful-O-Feeder chemical feeding system for continuous heavy duty. — FULBRIGHT LABORATORIES, INC.

M-14—Water Treatments — Bulletin 551, 12 pages, is a guide to water treatments specifically formulated for every need, with explanations of various aspects supplemented by tables and photographs. — ELGIN SOFTENER CORPORATION.

M-15—High Capacity Filters—Clearflow Bulletin, 8 pages, consists of photographs and captions showing the "Clearflow" filter with high capacity and self cleaning features. Enumerates recent improvements. — DAVIS FILTRATION EQUIPMENT CO., INC.

M-16—Chlorine Dispenser — Catalog 70C 3400, 8 pages, covers construction and operation of the Controlomatic Chlorinator, which incorporates many safety features of advanced design. — FISCHER & PORTER CO.

M-17—Boiler Water — Data Sheets P-101 through P-107 present technical data on chemicals for boiler water treatment including Ful-O-Fos, Fulkolloid, Oxy-Cide, Boilerkleen SL, and other products to meet different requirements.—FULBRIGHT LABORATORIES, INC.



CATALOGS AND BULLETINS . . . . . .

Reference literature available from manufacturers to help solve water treatment problems and apply materials and equipment.

Use Reader Service Card on Page 65

M-18—Industrial Water Treatment—Bulletin, 4 pages, charts 8-step treatment and control service for elimination of scale, sludge, corrosion, algae and impure steam.—IPCO LABORATORIES, INC.

M-19—Boiler Water Treatment & Engineering Service — Bulletin 5000-A, 12 pages, describes products, methods, and services offered to provide properly balanced water treatment and efficient water conditioning. Discusses Filmeen, Alkameen, Formula 659, Dearsol 25, Formula 134, and Formula 144, and explains functions of each. — DEARBORN CHEMICAL COMPANY.

M-20—Demineralizing Handbook — Index 4.01, Pub. 5800-E, 36 pages, starts with history of water treatment and includes sections on definition of terms, building the demineralizer system, and case histories.—COCHRANE CORPORATION.

M-21 — Deaerators — Bulletin No. D-54, 6 pages, shows cutaway drawings to illustrate design and construction features of deaerating feedwater heaters, and tells how selection should be made.—CHICAGO HEATER COMPANY.

M-22—Scale Solvent—Bulletin 10/60 200, 1 page, gives general instructions for cooling water scale solvent, and step-by-step procedure for clean-out. — BISCAYNE CHEMICAL LABORATORIES, INC.

M-23—Chlorine Gas Feeders — Ref. No. 0840.20-1, 4 pages, features two models of visible flow chlorinizers designed to assure continuous, accurate delivery of chlorine-water solution to the point of application. — B-I-F INDUSTRIES.

M-24—Valveless Gravity Filter — Bulletin 4351, 8 pages, tells how this type of filter costs less, and saves money after installation because it operates automatically without a single valve, agitator, pump, flow controller, or an attendant. — THE PERMUTIT COMPANY.

M-25—Rust Prevention — Bulletin 10M-9-59, 2 pages, explains how different formulas are prescribed, according to specific needs of water systems being treated, to remove and prevent rust, scale, and congestion. — THE NORTH AMERICAN MOGUL PRODUCTS CO.

M-26—Circulating Cooling Water — Coolex and SR-2 Bulletin, 4 pages, presents data on the products, Coolex and SR-2, which are used to treat circulating cooling water in air conditioning and refrigeration systems and keep equipment operating at peak efficiency. — ANDERSON CHEMICAL COMPANY.

M-27—Mixed-Bed Deionizer—Bulletin 512A, 6 pages, contains engineering and technical data on the Ultra Deionizer's two basic types, designed to produce high quality mineral-free water at low cost. — ELGIN SOFTENER CORPORATION.

M-28—Corrosion Control — Data Sheet, 2 pages, discusses "Pretreatment for Effective Corrosion Control." Tells how rapid film formation by pretreatment can improve cooling water corrosion control. — BETZ LABORATORIES, INC.

M-29—Products & Processes — Bulletin 80-A, 32 pages, is an indexed compilation of products for industrial water treatment, and auxiliary equipment. Illustrated with photographs and drawings. — INFILCO INCORPORATED.

M-30—Water Softeners — Bulletin No. 81167, 8 pages, gives selection data for industrial water softeners, water filters, deionizers. — CULLIGAN, INC.

M-31—Automatic Flow — Ref. No. 1400.20-1, 4 pages, explains operation and flexibility of automatic flow responsive equipment for liquid feed systems. — B-I-F INDUSTRIES.

M-32—Automatic Chemical Control —Chemicator Folder — Presents data on equipment designed specifically for automatic chemical control of scale, corrosion, algae, in cooling towers and evaporative condensers. — IPCO LABORATORIES, INC.

M-33—Brinemaking — Bulletin, 12 pages, "Efficient Use of Rock Salt in Brinemaking," tells how to get a saturated brine at lowest cost. Equipment is illustrated.—MORTON SALT COMPANY.

M-34—Water Treating Plan — Separate bulletins combine in folder to form "A Complete Water Treating Plan" for boiler feedwater and cooling water. Leaflets cover various aspects of treatment and equipment. —DEADY CHEMICAL COMPANY.

M-35—Boiler Cycle Blowdown—Bulletin 28X7731—Outlines correct procedures for boiler cycle blowdown, with illustrations to supplement explanation. — ALLIS-CHALMERS MFG. CO.

M-36—Boiler Water Conditioning — Booklet, 12 pages, presents 3-fold program including survey, treatment, and control, offered to Drew clients for their industrial plants.—E. F. DREW & COMPANY, INC.

M-37—Proportioning Pumps — Illustrated bulletin describes proportioning pumps and package chemical feeding units designed for controlled capacity, low cost, and high pressure.—THE BIRD-ARCHER COMPANY.

M-38—Two-Bed Ion-Exchange Demineralizers — Bulletin No. 200, 4 pages, explains principle of demineralization, advantages, construction, installation and operation, capacity, for many processing applications. — INDUSTRIAL FILTER & PUMP MFG. CO.

Industrial Water Treatment Reference Guide for the South-Southwest . . . . . .

M-39—Hot Water & Humidifiers — Kleerflo & Rustex Bulletin, 4 pages, introduces two water conditioners: Kleerflo for hot water systems, and Rustex for humidifying systems, used to stop rust and corrosion and prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

M-40—Hydrazine — Bulletin BW 8, 10 pages — Discusses chemical reduction of oxygen in boiler feedwater with Deoxy-Sol, a 35% aqueous solution of hydrazine. Gives flow diagram; covers handling and storage; includes bibliography. — FAIRMONT CHEMICAL CO., INC.

M-41—Air Conditioning Water Systems — Bulletin No. FAC-1 discusses corrosion and scale control for air conditioning water systems and describes equipment for various applications.—THE PEROLIN COMPANY, INC.

M-42—Industrial Zeolite Softeners— Bulletin 211, 4 pages, explains advantages of zeolite softeners in elimination of water hardness, efficient and economical operation, and individual plant design. — INDUSTRIAL FILTER AND PUMP MFG. CO.

M-43—Organic Glucosates — Reprint, 4 pages, from Chemical Engineering Catalog, discusses increased production and lowered costs resulting from application of organic glucosates for control of scale, corrosion and algae problems. —D. W. HAERING & CO., INC.

M-44 — Purification Equipment — General Catalog, 24 pages on Inversand Zeolite Water Softeners; 24 pages on Boiler Feedwater Treatment; other sections cover coagulator, demineralizing units, pressure type water filters. —HUNGERFORD & TERRY, INC.

M-45—Water Conditioning Services —Brochure outlines engineering services for zeolite water softeners, filters and purifiers; exchangers, aerators and degasitors; process and boiler water conditioning, including rebuilding and modernization. — SOUTHERN WATER CONDITIONING INC.

M-46—Hydrazine Feedwater Treatment — Scav-Ox Folder lists physical constants, advantages, and availability of Scav-Ox 35% hydrazine solution for boiler feedwater treatment, with diagram showing application. — WATER SERVICES, INC.

M-47—Water Treating Equipment — Bulletin 615, 24 pages, presents water treating equipment and allied products; illustrated with diagrams and photographs. List of typical installations is included. — ELGIN SOFTENER CORPORATION.

M-48—Sodium Zeolite Softeners — Index 3.01, 12 pages, illustrates and describes sodium zeolite softeners featuring the Cochrane hydromatic single control valve.—COCHRANE CORPORATION.

M-49—Chloride Dealkalizer — Booklet 300, 4 pages, introduces a new process for increasing capacity of anion exchange resins, with the "Cycloflo" valve for controlling cycles of flow in ion-exchange equipment.—AMERICAN WATER SOFTENER COMPANY, INC.

M-50—Heavy-Duty Softeners — Bulletin 81099, 4 pages, catalogs automatic and manual models of heavy-duty industrial water softeners designed to provide more soft water with less space and lower cost. — CULLIGAN, INC.

M-51—Water Consulting Service — Brochure 410-12-30, 24 pages, simulates an interview between a typical plant manager and a Hall engineer, with questions and answers regarding water problems and consultation services offered. — HALL LABORATORIES, Div. of Hagan Chemicals & Controls, Inc.

M-52—Greensand Zeolites — Hand Booklet, 8 pages, is a condensation of the physical and chemical properties of greensand zeolite, calcite, synthetic gel zeolite, gravels.—ZEOLITE CHEMICAL COMPANY.

M-53—Hypochlorinator — Cat. File No. 80.140, 4 pages, features the Series A-748 electrically operated dual head hypochlorinator, with photographs and technical data. — WALLACE & TIERNAN INCORPORATED.

M-54—Feedwater—Bulletin, 4 pages, offers solution to boiler feedwater treatment problem through scale prevention, corrosion control, suppression of foaming and carryover, sludge dispersion. — WESTERN CHEMICAL COMPANY.

M-55—Hot Process — Booklet 801, 8 pages, presents hot process softeners and hot zeolite softeners to reduce hardness, alkalinity, turbidity, silica, oxygen, carbon dioxide. — AMERICAN WATER SOFTENER COMPANY.

M-56—Scale & Corrosion — Bulletin 8959 tells how to protect boilers from scale and corrosion with Borgana 400; and Form No. SSB-554-30M lists advantages of Borgana water treatment for air conditioning and refrigeration systems. — STRONG, CARLISLE & HAMMOND COMPANY.

M-57—Condensate Receivers — Bulletin No. R-60, 4 pages, shows how Plasticlad condensate receivers give protection from internal corrosion with water temperatures up to 212 F, and feature a lining which extends outside all openings to keep corrosion from getting started. — CHICAGO HEATER COMPANY.

M-58—Automated Filter Plant — Report 147, 4 pages, is a case history of an automated IWF filter plant installation, accompanied by plant photographs. — R. P. ADAMS COMPANY, INC.

M-59—Pneumatic Controller — Cat. File No. 420.690, 4 pages, gives features, operation, and typical applications of pneumatic controller for metering pumps. — WALLACE & TIERNAN INCORPORATED.

M-60—Coagulant Aids — Bulletin HSP-919, 8 pages, covers use of chemicals to speed up and improve coagulation and sedimentation in industrial water clarification systems. — HAGAN CHEMICAL & CONTROLS, INC.

M-61—Cooling Water — Bulletin, 4 pages, presents aspects of cooling water problems and tells how they can be solved through properly formulated and controlled chemical treatment.—WESTERN CHEMICAL COMPANY.

M-62—Hot Lime Zeolite — Reprint No. 70-A, 12 pages, is from a paper by S. B. Applebaum delivered before an engineering society, on the subject of "Hot Lime Process Followed by Zeolite."—COCHRANE CORPORATION.

M-63—Condensate Lines — Corrodine Bulletin, 4 pages, explains how Corrodine eliminates and prevents corrosion in steam and return condensate lines. — METROPOLITAN REFINING CO., INC.

M-64—Coagulation — Bulletin A1, 8 pages, is a discussion of presently accepted coagulation theory, practical application, and actual case histories. — NALCO CHEMICAL COMPANY.

M-65—High Pressure Boilers — Bulletin A&A 458, 2 pages, tells how scale, foaming, carry-over, pitting and corrosion can be controlled through use of scientifically prepared formulas.—THE NORTH AMERICAN MOGUL PRODUCTS COMPANY.

M-66—Horizontal Plate Filter—Bulletin NBM-6, 4 pages, presents the "Batch Miser" for fine filtering and polishing, for small batch filtrations, designed to recover 100% of both liquid and solids without using a scavenger leaf. — AMERICAN MACHINE AND METALS, INC.

M-67—Recarbonation — Bulletin, 4 pages, describes and illustrates submerged combustion units for recarbonation, and outlines advantages. — OZARK-MAHONING CO.

M-68—Industrial Water — Bulletin 1E-1-54b, 26 pages, entitled "If You Use Water," starts with a discussion of the importance of water in industry, and continues with different types of water treatment. — ROHM & HAAS COMPANY.

M-69—Ion Exchangers — Bulletin Z-5, 60 pages, is a handbook for the men responsible for water supplies. Includes basic data on ways of conditioning water, and explains how to figure costs and results. — NALCO CHEMICAL CO.

M-70—High-Capacity Water Softening — Bulletin 4696, 6 pages, gives details on operation, specifications and performance of the new Permutit Model BD Softeners to answer the need for more soft water at lower cost.—THE PERMUTIT CO.

M-71—Bag Type Filters — Bulletin No. 7A, 12 pages, covers bag type pressure filters for acids, chemicals, water and other liquids. Diagrams show construction and operation. — WM. W. NUGENT & CO., INC.

M-72—Water Processed for Industry — Catalog 360, 12 pages, charts problem, cause, and correction. Discusses process water treatment for varied end uses. Explains consulting services available. —COMMERCIAL CHEMICAL PRODUCTS, INC.

M-73—Air Conditioning Systems — Vaporene Bulletin, 4 pages, tells how product cuts operating costs, safeguards capital investment, and increases the efficiency of air conditioning systems by elimination of scale, corrosion and slime. — METROPOLITAN REFINING CO., INC.

M-74—Self-Cleaning Filters — Catalog No. 52-100, 12 pages, presents design data and flow table, along with other engineering information and advantages of the Flo-Klean filter. — THE CUNO ENGINEERING CORPORATION.

M-75—Packaged Demineralizers — Bulletin 4721, 6 pages, summarizes applications, and gives other data on factory-assembled systems ready to connect and operate. Includes mixed-bed, two-step, non-regenerable and skid-mounted units.— THE PERMUTIT COMPANY.

M-76—Hot Process Softeners — Publication 4800, 24 pages, outlines factors in feedwater treatment, catalogs hot process softeners and accessories, illustrates design and construction, with photographs of actual installations. — COCHRANE CORPORATION.

M-77 — Microbiological Control — Technical Data File C3 — Contains several reprints or articles discussing wood decay, causes and cures, selection of treatments and corrosion caused by microorganisms. — NALCO CHEMICAL COMPANY.

M-78—Pressure Filters — Catalog NC-457, 12 pages, presents line of vertical leaf pressure filters for liquid clarification, for solids recovery. Illustrates types available, gives capacities and dimensions. — NIAGARA FILTERS.

M-79—Soluble Silicates — Bulletin 52-19, 12 pages, describes treatment of raw and waste waters with PQ soluble silicates; lists advantages and savings. — PHILADELPHIA QUARTZ COMPANY.

M-80—Treatment and Analysis — Manual, 60 pages — "Industrial Water Treatment and Analytical Procedures" outlines various testing procedures, and lists company's chemical products to treat boilers, air conditioning systems, humidification systems, cooling water and process water. — MATHIS WATER TREATING CO.

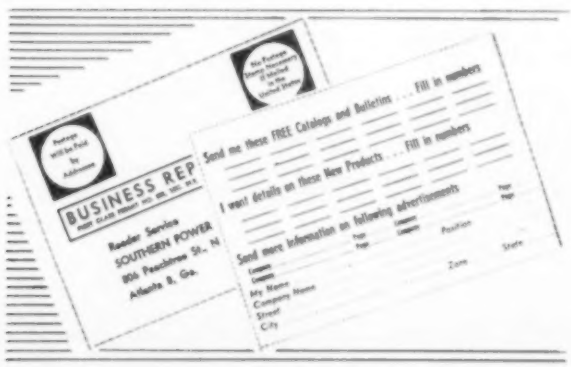
M-81—Ion Exchange Resins — Bulletin 1E-26-56b, 16 pages, explains method of deionization by Amberlite Monobed Ion Exchange Resins, discusses technique and advantages. — ROHM & HAAS COMPANY.

M-82—Sodium Zeolite Water Softeners — Bulletin 760, 6 pages, diagrams special design features of "no resin loss" water softeners; gives table of specifications. — COMMERCIAL CHEMICAL PRODUCTS, INC.

M-83—Filters — Bulletin No. 6-801, 12 pages, covers diatomaceous earth filtration: equipment, applications, elements, specifications, operation. — L*A WATER CONDITIONING, INC.

M-84—Tray Deaerator — Bulletin 4732, 4 pages, introduces a new line of tray deaerators, custom engineered to give maximum corrosion protection in boiler feedwater systems. — THE PERMUTIT COMPANY.

M-85—Industrial Filtration — Bulletin 651, 8 pages, lists typical applications of the Adams team of industrial filters, which are shown with cutaway illustrations and descriptions. — R. P. ADAMS COMPANY, INC.



FREE READER SERVICE

A full-size reader service card is provided for your convenience on page 65. USE IT to order catalogs listed in this section and for other services offered.

The directory on following pages lists water treatment company representatives that serve your area.

USE IT to help find the man you want to help you keep your equipment operating safely and efficiently.

M-86—Pretreatment — Tech. Data File C4 is an introduction to pretreatment and high level film formation for corrosion control in open recirculating cooling water systems. Includes special report. — NALCO CHEMICAL COMPANY.

M-87—Algae Control — Booklet No. 46-A, 6 pages, tells how to kill-off algae bloom with Phygon-XL in industrial water, recirculation systems, and other trouble spots. Tabulates advantages and directions for use. — NAUGATUCK CHEMICAL DIVISION, United States Rubber.

M-88—Synclinal Filters — Catalog No. 301, 10 pages, presents line of filters designed to perform at highest efficiency and reduce maintenance down-time to a minimum, in many varied uses. — MARVEL ENGINEERING COMPANY.

M-89—Cation Exchange Resin—Bulletin 1E-10-55, 14 pages, covers Amberlite IR-120, featuring high exchange capacity, unusual stability at elevated temperatures, and good chemical resistance over a wide pH range. — ROHM & HAAS COMPANY.

M-90—Cooling Water Treatment — Data Sheets P-108 through P-114 list uses, general properties, and other pertinent facts on different types of Rustisol for specific purposes in cooling water treatment. — FULBRIGHT LABORATORIES, INC.

M-91 — Ion Exchangers — Bulletin 1960-C, 16 pages, names a wide variety of industrial installations as examples of accomplishments in design and building of ion exchange equipment, with accompanying photographs and engineering data. — INFILCO INCORPORATED.

M-92—Filtration Media — Bulletin GEO-506A, 8 pages, illustrates major types of media for selective filtration, with notes on application, construction, operating pressure, and sizes. — COMMERCIAL FILTERS CORPORATION.

M-93—Liquid Filters — Bulletin 15, 6 pages, covers line of liquid filters offered in four models to fit all requirements, designed for easy maintenance and savings in pumping equipment repairs. — FILTROS INCORPORATED.

M-94—Engineered Equipment—Bulletin GEN-58, 6 pages, catalogs pressure filters, ion exchangers, demineralizers, water softeners, centrifugal pumps, heat exchangers, and other equipment for the chemical process industries. — INDUSTRIAL FILTER & PUMP MFG. CO.

M-95—Vacuum Water Filter — Bulletin 721-2M, 2 pages, features cutaway view of construction details, and gives standard sizes and flow rates for a new vacuum type water filter. — SPARKLER MANUFACTURING COMPANY.

M-96—Colloidal Control — Booklet, 14 pages — "The Sand-Banum Story" tells how the boiler scale problem can be solved through this specially prepared concentrate of organic colloids. — AMERICAN SAND-BANUM CO., INC.

M-97—Industrial Plant Water—Bulletin 1670A, 4 pages, introduces the Model RJ heavy duty, large volume, diatomite filter designed for use with electronic control systems providing full automatic operation. — SPARKLER MANUFACTURING COMPANY.

M-98 — Water Cooling Systems — Technical literature gives details of Pero-Klean dry acid cleaner to remove accumlated rust and scale formation while air conditioning equipment is operating, with Formet crystals to prevent further scale formation. — THE PEROLIN COMPANY, INC.

Buyer's Directory

This tabulation lists many of the important water treatment suppliers and their representatives in the South and Southwest. Some manufacturers, however, failed to furnish information requested.

R. P. ADAMS COMPANY, INC., 225 E. Park Drive, Buffalo 17, N. Y.

Florida, Fort Lauderdale: H. C. R. Folmer, 2506 Sea Island Drive. Phone JAckson 3-0771

Florida, Pensacola: The Chem-Quip Co., P. O. Box 2385. Phone (Area Code) 305-476-4424

Georgia, Decatur: Adams Engineering Sales, P. O. Box 888. Phone DRake 7-1741

Kentucky, Louisville 7: R. A. Mueller & Assoc., 132 St. Matthew Ave. Phone TWinbrook 5-6919

Louisiana, Baton Rouge: James H. Jones, P. O. Box 52831, Instrouma Station. Phone WAlnut 4-6406

North Carolina, Charlotte 1: Robert E. Mason Co., 1726 Hutchison Ave. Phone FRanklin 5-5747

Tennessee, Chattanooga 11: Paul A. Chapman & Assoc., P. O. Box 8205. Phone AMherst 6-8730

Tennessee, Elizabethton: Paul A. Chapman & Assoc., P. O. Box 787. Phone LIncoln 2-6561

Virginia, Richmond 21: Atlas-Misrock Co., 3318 West Cary St. Phone ELgin 8-4501

ALLIS-CHALMERS MFG. CO. Milwaukee 1, Wisc.

Alabama, Birmingham 9: G. H. Hoffman, 1824 29th Ave. South. Phone TRemont 9-8621

Florida, Jacksonville 7: S. B. Lamica, 1628 San Marco Blvd. Phone EXbrook 8-6441

Florida, Miami 32: W. E. Scott, 25 S.E. 2nd Ave. Phone FRanklin 9-5691

Florida, Tampa 2: Y. S. Hogg, Jr., 405 S. Morgan St. Phone 2-8371

Georgia, Atlanta 3: J. M. Duncan, 57 Forsyth St., N.W. Phone JAckson 2-7116

Louisiana, New Orleans 12: J. E. Watson, Jr., 210 Baronne St. Phone JA 5-8623

Louisiana, Shreveport 23: L. G. Park, 624 Travis St. Phone 2-3274

North Carolina, Charlotte 6: C. B. Rumble, Jr., 300 E. 7th St. Phone EDison 4-1667

Oklahoma, Oklahoma City: H. L. Pickens, 401 N. Harvey. Phone CEntral 9-1631

Oklahoma, Tulsa 3: R. I. Moore, 320 E. Archer St. Phone GIbson 7-9163

Tennessee, Chattanooga 2: J. W. Roberts, Hamilton National Bank Bldg. Phone AMherst 6-5101

Tennessee, Knoxville 2: A. R. Knauss, 531 S. Gay St. Phone 2-2165

Texas, Abilene: J. S. Barnett, 412 First National Bank Bldg. Phone ORchard 4-3472

Texas, Amarillo: Wm. M. O'Connor, Amarillo Bldg., 301 Polk St. Phone DRake 3-1766

Texas, Beaumont: T. G. Smith, 490 Orleans St. Phone TErminal 5-2535

Texas, Corpus Christi: R. H. Godeke, 416 N. Chaparral St. Phone TUlip 3-8521

Texas, Dallas 2: H. L. Reynolds, 1800 N. Market St. Phone RIverside 2-7144

Texas, Fort Worth 1: Karl J. Ratliff, 408 W. 7th St. Phone EDison 2-8331

Texas, Houston 3: D. R. Boise, 1104 Dowling St. Phone CApitol 5-0691

Texas, San Antonio 5: E. R. Hury, 902 Frost National Bank Bldg. Phone CApitol 7-7022

AMERICAN SAND - BANUM COMPANY, INC., 1 N. Merrick Ave., Merrick, L. I., New York

Florida, St. Petersburg: H. K. Wilson, 2126 14th St., South. Phone 52-9703

Georgia, Savannah: Savannah Laundry Machinery Co., P. O. Box 3102. Phone ADams 3-1931

Tennessee, Memphis: Industrial Boiler & Equipment Co., 3050 Broad Ave. Phone FA 4-6628

Texas, Houston: Western Sand-Banum Co., Inc. 1717 Chenevert St. Phone FAirfax 3-9176

AMERICAN WATER SOFTENER COMPANY, DeHaven Road, West Conshohocken, Pa.

Alabama, Mobile: Industrial Power Equipment Co. Inc., 951 Government St. Phone HEmlock 2-7802

Georgia, Atlanta 5: Lewis M. Crowe Co., P. O. Box 12288, 111 Tuxedo Terrace N.W. Phone CEdar 7-9209

Missouri, Kansas City 11: Hughes Machinery Co., 4212 Main St. Phone VAlentine 1-7021

Missouri, St. Louis 17: Rhodes Equipment Co., 1401 S. Brentwood Blvd. Phone WOodland 2-8820

Tennessee, Memphis 4: R. E. Overman Co., Room 104, 2056 Union Ave. Phone BRoadway 5-0844

Texas, Houston: Haylett O'Neill and Son, P. O. Box 1166. Phone JAckson 9-3879

West Virginia, Charleston: Harris Pump and Supply Co., 922 Quarrier St. Phone DIckens 6-0889

ANDERSON CHEMICAL COMPANY, INC., P. O. Box 1424, Macon, Ga.

Alabama, Andalusia: Ralph Kirkland, P. O. Box 91. Phone CA 2-5243

Alabama, Birmingham 13: David W. Kreutz, 301 Dexter Ave. Phone TR 9-4832

Florida, Jacksonville: I. J. Still, 3656 Coronado Rd. Phone EX 8-1020

Florida, Tampa: Graham D. Severance, 10227 Fleetwood Dr. Phone WE 4-0986

Georgia, Atlanta 18: J. R. Stem, 2141 McKinley Rd., N.W. Phone TR 6-8062

Georgia, Macon: J. W. Anderson, 1320 Briarcliff Rd. Phone SH 2-7919

Georgia, Savannah: S. M. Smith, 2 Elder Court. Phone EL 5-5531

Louisiana, Slidell: Earl Abshier, P. O. Box 448. Phone 1453-J

Mississippi, Jackson: W. Ray Benton, P. O. Box 8151. Phone FL 3-6808

Missouri, Springfield: R. B. Miller, 1622 S. Delaware. Phone TU 1-2196

North Carolina, Charlotte 1: R. M. Holmes, P. O. Box 10131. Phone JA 3-4414

North Carolina, Raleigh: J. A. Duke, 2338 Airline Dr. Phone TE 4-0900

South Carolina, Columbia: George M. Kellogg, 4719 Reamer Ave. Phone SU 7-6315

Tennessee, Chattanooga 11: W. MacPherson, 606 Maple Lane. Phone MA 2-0283

Tennessee, Memphis 2: Branch Office, P. O. Box 2432, DeSoto Station, Phone BR 2-2806

Texas, Dallas 7: Branch Office, P. O. Box 10444, Industrial Station. Phone RI 8-7080

Texas, Houston 24: Charles G. Dunning, 9733 Warwana Rd. Phone HO 5-3888

Texas, Texarkana: William Harry Moore, 2441 Oaklawn Dr. Phone 32-8894

BETZ LABORATORIES, INC., Gillingham & Worth Streets, Philadelphia 24, Pa.

Florida, Pompano Beach: F. W. Hanaway, 2631 N.E. 48th St. Phone WHitehall 1-5653

Georgia, Atlanta 19: J. W. Wallace, 2763 Winding Lane, N.E. Phone MElrose 6-2470

Georgia, Decatur: A. D. Eichers, 2862 Monterey Drive. Phone BUtler 9-4744

Kansas, Wichita 12: E. D. Smith, 828 Peterson Ave. Phone PArkview 2-1043

Kentucky, Florence: W. F. Buerger, 9 Valley Drive. Phone ATlantic 3-4713

Kentucky, Louisville: L. G. Hagerty, 1209 Old Mill Road. Phone CA 7-4007

Louisiana, Kenner: M. F. Smith, 3720 Connecticut Ave. Phone 71-1709

Louisiana, Monroe: S. R. Graham, Rt. 3, Box 606, Curve Drive. Phone FA 5-5996

Louisiana, New Orleans 23: M. H. Piper, 179 Colonial Club Drive. Phone KEnner 4-6057

Louisiana, Shreveport: B. M. Lentz, 6301 Canal Blvd. Phone ME 1-7331

Maryland, Baltimore 14: C. J. Maag, 8104 Harris Ave. Phone NOrthfield 8-1575

Maryland, Towson 4: E. H. Benjamin, 810 Stevenson Lane. Phone VAlley 3-2579

Missouri, St. Louis 26: F. G. Koenig, 8928 Larchwood Ct. Phone VIctor 3-1857

North Carolina, Charlotte 7: V. Braxton, 1000 Linda Lane. Phone EMerson 6-0813

Oklahoma, Norman: T. Blenkinsop, P. O. Box 661. Phone JEfferson 4-7220

Oklahoma, Oklahoma City 1: B. D. Greer, P. O. Box 391. Phone WI 6-3274

Oklahoma, Sapulpa: M. L. Roberts, P. O. Box 1039. Phone 2854

Texas, Beaumont: J. M. Cahal, 75 Ruth. Phone TE 8-6066

Texas, Bellaire 101: C. W. Brown, P. O. Box 202. Phone MOhawk 7-7643

Texas, Corpus Christi: W. E. Hoskinson, P. O. Box 2083. Phone POrtland 4951

Texas, South Houston: J. D. Owen, P. O. Box 412. Phone MOhawk 7-7643

Virginia, Richmond: J. D. Evans, 3514 Hanover Ave., Apt. 304. Phone EL 8-0565

Virginia, Roanoke: F. W. Wallenfelsz, 4343 Holmes St. N.E. Phone EMpire 6-6622

West Virginia, Parkersburg: R. J. Brenner, 616 Lake View Drive. Phone GA 2-3352

B-I-F INDUSTRIES, INC., 345 Harris Ave., Providence 1, R. I.

Florida, Jacksonville 1: W. D. Taulman & Assoc., P. O. Box 4851. Phone RAymond 4-5520

Georgia, Atlanta 5: W. D. Taulman & Assoc., 415 E. Paces Ferry Road, N.E. Phone CEdar 7-0311

Louisiana, Baton Rouge 6: B-I-F Industries, Inc., P. O. Box 4765, Audubon Station. Phone DIckens 3-4451

Oklahoma, Edmond: Ritzhaupt and Company, P. O. Box 54. Phone VIctor 3-1165

Oklahoma, Tulsa 23: Arduser & Company, P. O. Box 3645. Phone GIbson 7-8311

Tennessee, Memphis 3: Engineered Plant Equipment, Inc., Room 308, Dupont Bldg., 22 South Second St. Phone JAckson 6-6232

Texas, Amarillo: Lewis Dodson Engr. Co., 75 Hughes St. Phone DRake 2-1075

Texas, Dallas: B-I-F Industries, Inc., 4519 North Central Expressway. Phone LAkeside 6-8631

Texas, Houston: B-I-F Industries, Inc., 2502 North Boulevard. Phone JAckson 6-1355

Texas, San Antonio 6: Texas Filter Co., Inc., 300 Blum St. Phone CApitol 6-6291

THE BIRD-ARCHER COMPANY, 4337 N. American Street, Philadelphia 40, Pa.

D. C., Washington: James S. Moran, 5242 Joan Lane, S.E. Phone CHerry 8-4600

Louisiana, Shreveport: Paul E. Shaughnessey, 3806 Milton St. Phone ME 5-7607

Texas, Greggton: Edward N. Roach, P. O. Box 5894. Phone PLaza 9-5854

BISCAYNE CHEMICAL LABORATORIES INC., 200 N.E. 11th St., Miami 32, Fla.

Industrial Water Treatment Reference Guide for the South-Southwest . . . .

CHICAGO HEATER COMPANY, 332 S. Michigan Ave., Chicago 4, Ill.

Alabama, Birmingham 9: Heckeroth Engineering Sales Co., Box 5882, Homewood Station. Phone TRemont 1-2866

Georgia, Atlanta 3: P. H. Nichols and Company, 400 Whitehead Bldg. Phone JAckson 4-4921

Kentucky, Louisville 2: Allan K. Cook Company, 604 West Main St. Phone JUniper 7-1269

Louisiana, New Orleans 18: Frank P. Fischer Engineering Co., P. O. Box 4153, 7924 Maple St. Phone UNiversity 1-1414

Oklahoma, Tulsa 9: Bagwell Company, P. O. Box 3442, 1740 E. 6th St. Phone LUther 2-8217

Tennessee, Memphis 6: Process & Power, Inc., P. O. Box 10138, 1565 Harbor Ave. Phone WHitehall 2-3253

Texas, Dallas 6: Bernhard Engineering Sales Co., 309-311 Meadows Bldg. Phone EMerson 3-4301

Texas, Houston 4: Hugh Brightwell, 4101 San Jacinto St. Phone JAckson 2-4339

Texas, San Antonio 6: Texas Filter Company, Inc., P. O. Box 367, 300 Blum. Phone CApitol 6-6291

Virginia, Norfolk: Shultz & James, Inc., 4807 Colley Ave. Phone MAdison 2-9859

Virginia, Richmond 19: Shultz & James, Inc., 9 East Cary St. Phone MIlton 4-3021

CLAYTON MARK & COMPANY, 1900 Dempster St., Evanston, Ill.

Florida, Clearwater: G. E. Rogers, 1832 Green Hills Drive. Phone 34-1063

Georgia, Atlanta: Wm. Chrimes, 2006 Westminster Way, N.E. Phone DRake 7-2169

Mississippi, Jackson: Arch Payton, 760 Lakeland Drive. Phone EMerson 6-9779

Missouri, Springfield: John Williams, 1825 Prairie Lane. Phone TUxedo 1-1589

Texas, Houston: Robert Meineke, P. O. Box 12364

Virginia, Roanoke: James Lemke, P. O. Box 1225. Phone SPruce 4-1277

COCHRANE CORPORATION, 17th St. below Allegheny Ave., Philadelphia 32, Pa.

D. C., Washington 6: Robert M. Austin, Barr Bldg.

Georgia, Atlanta 24: Boiler Equipment Service Co., P. O. 13138, 1079 Alco St. Phone MElrose 4-7373

Louisiana, New Orleans 12: Allan J. Harris Co., 400 Balter Bldg. Phone TUlane 0126

Maryland, Baltimore 11: William A. Milby Company, Inc., 2701 Cresmont Ave.

Missouri, Kansas City 30: Messplay Machinery Company, 5045 Prospect Ave.

Missouri, St. Louis 1: Lane Machinery Company, 419 Buder Bldg., 7th & Market Sts.

North Carolina, Charlotte 2: Brown & Morrison, P. O. Box 4297, 1900 E. 7th St. Phone EDison 3-0774

Tennessee, Knoxville 17: Dickey Engineering Co., 3009 Central Ave. N.W. Phone 4-8641

Texas, Amarillo: S. C. Covington Co., Inc., Amarillo Bldg. Phone DRake 3-5321

Texas, El Paso: Associated Engineers, P. O. Box 5384, 511 Hawkins Road. Phone PR 2-3233

Texas Houston 1: Alliger & Sears Co., 2203 Fannin St. Phone MIssion 5-6033

Virginia, Richmond 6: Hawkins-Hamilton Co., P. O. Box 7128, 3339 W. Cary St. Phone ELgin 3-4481

COMMERCIAL CHEMICAL PRODUCTS, INC., Puraq Water Softener Division, 11 Paterson Ave., Midland Park, N. J.

D. C., Washington: J. E. Sier, 30-51 Idaho Ave., N.W. Phone EMerson 2-8289

COMMERCIAL FILTERS CORPORATION, 2 Main Street, Melrose 76, Mass.

Florida, Jacksonville 7: H. C. Warner, P. O. Box 5801. Phone FLanders 9-3266

Louisiana, New Orleans 12: C. R. Clingman, 306 Pere Marquette Bldg. Phone MAgnolia 6316

Maryland, Baltimore 1: Tate Engineering, Inc., 516 South Eutaw St. Phone LExington 9-0787

Missouri, Kansas City 12: W. C. Carolan Co., 612 West 47th St. Phone JEfferson 1-5505

Missouri, St. Louis 3: Van Devanter Engineering Co., 2207 Pine St. Phone GEneva 6-1800

Oklahoma, Tulsa 5: Power Machinery Co., 3900 South Memorial. Phone RIverside 3-2535

Texas, Houston 25: Shaw Engineering, Inc., P. O. Box 20073. Phone JAckson 9-4598

CULLIGAN, INC., Northbrook, Ill.

THE CUNO ENGINEERING CORPORATION, 80 South Vine St., Meriden, Conn.

Alabama, Birmingham 9: G. S. Edwards Co., Inc., 1920 28th Ave. South. Phone TRemont 1-0251

Georgia, Atlanta 5: Control Equipment Co., Inc., P. O. Box 11795. Phone CEdar 7-1688

Louisiana, New Orleans 25: Eggelhof Engineers Inc., 4524 Thalia St. Phone UNiversity 6-4548

North Carolina, Winston-Salem: The Cuno Engineering Corp., Branch Office, 357 Miller St. S.W. Phone PArk 3-8702

Tennessee, Memphis 14: G. H. Avery Co., 944 Rayner St. Phone BRoadway 2-3086

Texas, Houston: Eggelhof Engineers, Inc., 1912 Hussion St. Phone CApitol 8-6471

DAVIS FILTRATION EQUIPMENT CO., INC., 149 Broadway, New York 6, N. Y.

Texas, Bellaire 101: Datum Engineering Co., P. O. Box 314. Phone MOhawk 5-0893

DEADY CHEMICAL COMPANY, 1401 Fairfax Trafficway, Kansas City 15, Kansas

Alabama, Mobile: Earl T. Ehman, P. O. Box 6031. Phone GReenwood 9-3515

Kansas, Kansas City 15: 1401 Fairfax Trafficway. Phone MAyfair 1-3569

Louisiana, Baton Rouge 8: Gus Pailet, 4824 Woodside Drive. Phone WAlnut 4-1698

Louisiana, New Orleans 18: James D. Maddox, 171 Audubon Blvd. Phone UNiversity 6-2701

Mississippi, Jackson 6: H. T. Allen, P. O. Box 9806, Northside Station. Phone EMerson 2-1834

Missouri, St. Louis 1: Parker P. Powell, Jr., Room 308, 705 Olive St. Phone CHestnut 1-7393

Tennessee, Knoxville: G. Walter Sutton, P. O. Box 1212. Phone 2-8945

Tennessee, Memphis: Robert S. Bronaugh, P. O. Box 1782. Phone BRoadway 4-1672

DEARBORN CHEMICAL COMPANY, Merchandise Mart, Chicago 54, Ill.

Florida, Clearwater: W. W. Clark, Fleetwood Apts. Phone CLearwater 38-4311

Georgia, Decatur: L. J. King, 765 Iris Terrace. Phone MElrose 6-3223

Louisiana, New Orleans 4: R. W. Kendrick, Gulf Engineering Co., Inc., 1000 S. Peters St. Phone JAckson 2-4421

North Carolina, Charlotte: F. I. Chapman, 2218 Chambwood Drive. Phone EDison 2-3301

North Carolina, Greensboro: H. B. Lewis, 409 Westdale Place. Phone BRoadway 2-1351

Oklahoma, Tulsa 3: R. W. Kelly, 213 Midco Bldg. Phone GIbson 7-4878

Tennessee, Nashville 4: G. E. MacLean, District Manager, 726 Sixteenth Ave. South. Phone CHapel 2-0262

Texas, Dallas 6: R. T. Moran, District Manager, 5526 Dyer St. Phone EMerson 8-2050

Texas, Fort Worth 10: R. L. Oliver, 2233 Huntington Lane. Phone WAlnut 4-1950

Texas, Houston 21: C. M. Smith, Gulf Engineering Co., Inc., 4425 Dixie Drive. Phone RIverside 7-5510

Texas, Odessa: W. R. Trawick, 721 Lincoln Ave. Phone FEderal 7-8786

Texas, White Deer: J. R. St. Clair, P. O. Box 157. Phone TUlip 3-4601

DREW & CO., INC., E. F., 15 East 26th St., New York 10, N. Y.

North Carolina, Asheville: M. M. Matthews, Southeastern Dist. Mgr., 351 Lakeshore Drive.

Texas, Dallas 4: K. W. Renson, Southwestern Dist. Mgr., 3814 San Jacinto.

ELGIN SOFTENER CORPORATION, 132 North Grove Ave., Elgin, Ill.

Florida, Jacksonville: Mayfield & Son, Inc., 1102 First St., Neptune Beach. Phone CHerry 9-2076

Georgia, Atlanta 5: Stephen C. May, 3551 Ivy Road, N.E. Phone CEdar 7-1162

Louisiana, New Orleans 15: Betz Engineering Sales Co., 1719 Toledano St. Phone TWinbrook 5-8691

Maryland, Baltimore 18: Lamb Engineering Co., 2125 Maryland Ave. Phone BElmont 5-4740

Missouri, St. Louis 1: F. S. Crook, Inc., 1004 Market St. Phone CHestnut 1-3511

Oklahoma, Tulsa 23: Arduser & Co., 303 S. Frankfort Ave. Phone GIbson 7-8311

Tennessee, Nashville: R. E. Gardner Co., 1121 Church St. Phone ALpine 5-0621

Texas, Corpus Christi: Stanley E. Kerr, 3534 Pecan St. ULysses 2-2821

Texas, Dallas 35: Paul Simmons Co., 2505 W. Mockingbird Lane. Phone FLeetwood 7-2438

Texas, El Paso: Geo. S. Thomson Co., 611 N. Campbell St. Phone KEystone 3-9503

Texas, Houston 5: Plant Equipment Co., 2401 Dunstan Road. Phone JAckson 9-0131

Virginia, Richmond 20: Berkness Control & Equipment Corp., 308 W. Cary St. Phone MIlton 3-5357

FILTROS INCORPORATED, 603 W. Commercial St., East Rochester, N. Y.

FISCHER & PORTER COMPANY, 501 Jacksonville Road, Warminster, Pa.

Georgia, Atlanta 19: P. W. Williams, 4157 Oak Forest Drive, N.E. Phone GLendale 7-0660

North Carolina, Charlotte: E. R. Kenney, 536-A Wakefield Drive. Phone FR 6-5509

Texas, Dallas 24: C. G. Wanner, 3632 Holiday Court. Phone FE 7-6696

Texas, Houston: J. B. Howell, 3809 Turnberry Circle. Phone MOhawk 7-3125

FULBRIGHT LABORATORIES, INC., 1201 South Graham St., Charlotte, N. C.

Florida, Orlando: Robert O. Hagerup, 811 Lake Eve Drive. Phone CY 5-1574

North Carolina, Burlington: Forrest D. Loy, 333 Harden St. Phone CAnal 8-8941

North Carolina, Shelby: John E. McMurry, P. O. Box 407. Phone HU 7-5612

South Carolina, Columbia: Carl D. Tennant, 4030 Rosewood Drive, Apt. 1. Phone SU 7-2933

South Carolina, Greenville: Herman R. Knebel, 3 Briarwood Blvd., Route 140. Phone CH 4-3492

South Carolina, Rock Hill: Frank M. Pitts, 756 Myrtle Drive. Phone 32 7-4850

Tennessee, Johnson City: Fred F. Dendler, 1201 Althea St. Phone WA 6-9201

Virginia, Richmond: L. A. Barker, Jr., P. O. Box 4501, Ridge Road Station. Phone AT 8-6264

GARRATT-CALLAHAN COMPANY, 30 Rollins Road, Millbrae, California

Georgia, Atlanta: Garratt-Callahan Co., 68 Peachtree St., N.W. Phone JAckson 3-4137

Texas, Dallas: Garratt-Callahan Co., 5727 Gaston Ave. Phone TAylor 4-0469

GENERAL IONICS CORPORATION, 5121 Clairton Blvd., Pittsburgh 36, Pa.

Alabama, Birmingham 13: Thomas Engineers

Alabama, Huntsville: James S. Wall

Florida, West Palm Beach: Ever-Soft Water Softeners, 3625 S. Dixie. Phone TEmple 3-2800

Texas, Lubbock: Lubbock Servisoft, 3308 Hartford. Phone SWift 9-3010

GRAVER WATER CONDITIONING CO., 216 West 14th St., New York 11, N. Y.

Florida, Tampa 9: E. R. Crockett Associates, P. O. Box 10524. Phone REdwood 7-3779

Georgia, Atlanta 4: E. L. Shuff & Associates, Room 124, 3120 Maple Drive, N.E. Phone CEdar 7-9215

Louisiana, New Orleans: Coastal Engineering Corp., P. O. Box 1366. Phone EXpress 2194

Missouri, Kansas City 11: George W. Haynes Co., V.F.W. Bldg.—Suite 929, 406 W. 34th St. Phone JEfferson 1-0065

Missouri, St. Louis 8: Howell Engineering Equipment Co., 4229 Lindell Blvd. Phone JEfferson 5-1170

Oklahoma, Oklahoma City: Process Equipment Corp., 1824½ Linwood. Phone CEntral 2-4757

Tennessee, Memphis 3: Engineered Plant Equipment, Room 308, Dupont Bldg., 22 S. 2nd St. Phone JAckson 6-6232

Texas, Bellaire: Datum Engineering Co., P. O. Box 314. Phone MOhawk 5-0893

Texas, El Paso: G. M. Wallace & Co., 512 Electric Bldg. Phone KEystone 2-5439

Virginia, Richmond 21: Atlas-Misrock Co., 3318 West Cary St. Phone ELgin 8-4501

HAERING & CO., INC., D. W., P. O. Box 10337, San Antonio 21, Texas

HAGAN CHEMICALS & CONTROLS, INC., Hagan Center, Pittsburgh 30, Pa.

Alabama, Birmingham 9: Joseph W. Eshelman & Co., Inc., 1812 28th Ave. So., Homewood. Phone TRemont 9-3462

Arkansas, Little Rock: Hagan Chemicals & Controls, Inc., 107 W. 12th St. Phone FRanklin 4-7745

Louisiana, New Orleans 10: Coastal Engineering Corp., 1500 Tchoupitoulas St. Phone EXpress 2194

Missouri, Clayton 5: Hagan Chemicals & Controls, Inc., 10 S. Brentwood Blvd. Phone PArkview 6-3121

North Carolina, Charlotte 9: Joseph W. Eshelman & Co., Inc., 1808 Montford Drive. Phone JAckson 3-3399

Texas, Houston 1: Maintenance Engineering Corp., 3711 Clinton Drive. Phone CApitol 2-2351

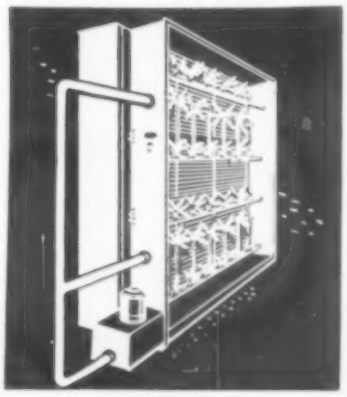
Texas, Midland: Basin Engineering, Inc., Farm Road 715. Phone MUtual 2-9765

HUNGERFORD & TERRY, INC., 226 Atlantic Ave., Clayton, N. J.

Alabama, Birmingham 5: Ed. F. Smith, Jr., 2200 Magnolia Ave. South. Phone FAirfax 4-6688

Florida, Miami (Coconut Grove): A. R. Morse Equipment Co., 3030 Grand Ave. Phone HIghland 8-0679

Florida, Ormond Beach: H. R. Myers, 25 N. Oakview Circle



Industrial Water Treatment Reference Guide for the South-Southwest . . . .

Kentucky, Louisville 2: Allan K. Cook Co., 604 W. Main St. Phone JUniper 7-1269

Louisiana, Metairie: S. G. Davis, 475 Woodvine Ave. Phone VErnon 5-9093

North Carolina, Charlotte: E. H. Levan, Jr., 227 W. 3rd St. Phone FRanklin 7-6643

Tennessee, Memphis 6: Process & Power, Inc., 1565 Harbor Ave. Phone WHitehall 2-3253

Virginia, Arlington 9: D. M. Hungerford, The Virginian — Apt. 506, 1500 Arlington Blvd. Phone JAckson 7-3672

ILLINOIS WATER TREATMENT COMPANY, 840 Cedar Street, Rockford, Ill.

Florida, Pensacola: The Chem-Quip Company, Scenic Highway. Phone 47 6-4424

Kentucky, Louisville 7: R. A. Mueller & Associates, 132 St. Matthews Ave. Phone TWinbrook 5-6919

Louisiana, Baton Rouge 5: The Chem-Quip Company, 4047 Hundred Oaks Ave. Phone WAlnut 4-6406

Maryland, Baltimore: H. A. McCormick, Phoenix P. O., Baltimore County. Phone NOrmandy 6-2333

Missouri, Kansas City 15: Passen Engineering Company, 9410 Chadwick. Phone MItchell 9-1312

Missouri, St. Louis 17: Process Engineering & Equipment Co., 9011 Manchester Road. Phone WOodland 2-5676

Tennessee, Chattanooga 5: A. G. Brown Company, 440 Frazier Ave. Phone AMherst 7-8174

Texas, Houston 2: The Tennant Company, 675 Gulf Bldg. Phone CApitol 8-8454

INDUSTRIAL CHEMICAL & SUPPLY CO., INC., 489 Stephens St. (P. O. Box 10914), Atlanta 10, Georgia

INDUSTRIAL FILTER & PUMP MFG. CO., 5900 Ogden Ave., Cicero 50, Ill.

Florida, Lakeland: Process Equipment & Engineering Co., 2440 Jonila Ave. Phone MUtual 6-5657

Georgia, Atlanta: John R. Davis & Co., 3038 Surry Lane, Chamblee. Phone GLendale 7-5901

Missouri, Kansas City 15: The Walling Co., P. O. Box 9243, Prairie Village Station. Phone NIagara 8-2500

Missouri, St. Louis 31: Beaco Equipment Co., 1304 Christine Ave. Phone YOrktown 5-8600

Tennessee, Memphis 11: N. Hunt Moore & Assoc., 3373 Poplar Ave. Phone FAirfax 7-6077

Texas, Dallas 29: White Engineering Co., 3515 Orchard Ridge Court. Phone FLeetwood 2-6395

Texas, Houston 19: The Chavigny Co., 2200 Welch St. Phone JAckson 3-1733

INFILCO INCORPORATED, P. O. Box 5033, Tucson, Arizona

Alabama, Birmingham 9: R. H. Whitney, 2811 South 20th St. Phone TRemont 9-1761

Florida, Winter Park: D. E. Austin, 1909 Kimbrace Place. Phone MIdway 4-9974

Georgia, Smyrna: G. W. Paulette, 476 Spring Hill Road, Route 2. Phone POplar 6-3209 Atlanta

Kentucky, Louisville 4: The Marrick Co., Inc., 1905 Bardstown Road. Phone GLendale 1-4811

Louisiana, Baton Rouge 6: H. F. Martin, P. O. Box 4676, Audubon Station. Phone DIckens 3-9613

Oklahoma, Tulsa 3: R. P. Kuykendall, 605 Mayo Bldg. Phone GIbson 7-5453

Texas, Dallas 3: S. W. Edwards, 1115 South Beckley. Phone WHitehall 2-1241

Texas, Houston 24: L. L. Hiser, 9051 Katy Road. Phone HOmestead 6-0662

Virginia, Roanoke: W. J. Firth, P. O. Box 774. Phone DIamond 2-0777

INTERNATIONAL SALT COMPANY, Clarks Summit, Pa.

Louisiana, New Orleans 12: Ben Wolverton, Jr., Whitney Bank Bldg.

North Carolina, Charlotte 1: Wm. W. Harris, P. O. Box 2132

North Carolina, Newton: John L. Hewitt, P. O. Box 372

IONAC CHEMICAL COMPANY, a Division of Pfaudler Permutit Inc., Birmingham, New Jersey

Alabama, Birmingham: K. W. Herman, 2154 Hillside Circle. Phone TRemont 9-4441

Florida, Tallahassee: E. Petrie, 1108 Miccosukee Road. Phone 2-1143

Georgia, Atlanta: C. P. Keith, 3131 Maple Drive, N.E. Phone CEdar 7-3321

Maryland, Silver Spring: S. H. Corwin, 8605 Cameron St. Phone JUniper 9-3731

IPCO LABORATORIES, INC., 2710 Apple Valley Road, N.E., Atlanta 19, Georgia

Alabama, Alton: Robert H. Storey, P. O. Box 294. Phone VE 3-9731

North Carolina, Charlotte 1: W. Baine Martin, 1824 Independence Blvd., N.E. Phone ED 3-8352

North Carolina, Fayetteville: J. J. Duhig, General Delivery. Phone HE 2-9848

Tennessee, Nashville: R. P. Eppensteiner, 2013 Capers Ave. Phone CY 1-5146

Virginia, Falls Church: R. D. Foster, 988 N. Roosevelt St. Phone JE 4-7952

L*A WATER CONDITIONING, INC., 1007 Air Way, Glendale 1, California

Alabama, Birmingham: Durham & Ozier Co., 907 Seventh Ave. So. Phone ALpine 1-7105

Arkansas, Little Rock: Mullins Engineering Co., P. O. Box 3358, 1401 Cantrell Road. Phone MOhawk 3-108

Florida, Coral Gables 34: John Dacy, P. O. Box 34-666. Phone MO 7-1075

Florida, Daytona Beach: John Cohen, 2542 Coral Way. Phone CL 3-1539

Florida, Jacksonville: R. A. Litkenhaus & Associates, 11 Florida Ave. Phone ELgin 5-3659

Florida, St. Petersburg: Henry G. Libby, P. O. Box 11664. Phone OR 1-4454

Louisiana, New Orleans: Greves and Roussel, 1623 Dumaine St. Phone JAckson 2-0704

Oklahoma, Tulsa: Ray Clark Associates, P. O. Box 2463, 3220 N. Garrison. Phone DIamond 3-7686

Tennessee, Memphis: Power Equipment & Engineering Co., P. O. Box 7507, 3050 Broad Ave. Phone FA 4-6628

Texas, San Antonio: R. A. Lower Company, 430 West Mariposa Drive. Phone PErshing 4-1604

Virginia, Arlington: Bill Strickler, 703 N. Abingdon St. Phone JAckson 7-7089

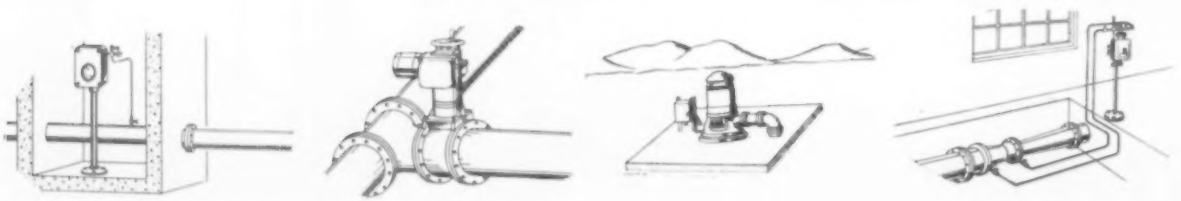
Virginia, Richmond: W. Wallace Neale Co., 211 Moore Bldg., 16½ North Ninth St. Phone MIlton 8-7592

MARVEL ENGINEERING COMPANY, 7227 N. Hamlin Ave., Chicago 45, Ill.

MATHIS WATER TREATING CO., P. O. Box 133, U. S. Hwy. 29 North, Anderson, S. C.

Florida, Miami: Nelson D. Wagener, 6208 S.W. 8th St. Phone MO 7-9595

METROPOLITAN REFINING CO., INC., 50-23 Twenty-Third St., Long Island City 1, N. Y.



Arkansas, Little Rock 1: Lynton L. Scharff, 3001 Ozark Ave. Phone MOhawk 3-6659

Delaware, Wilmington 8: Nicholas S. Riggin, P. O. Box 5052. Phone WYman 8-3190

Florida, Eustis: J. Carl Smith, 517 Grove St. Phone ELgin 7-2717

Georgia, Rossville: Wm. E. Baker, P. O. Box 190. Phone UNiversity 6-2773

Maryland, Baltimore 6: John C. Naudain, 16 Elmont Ave. Phone NO 5-3635

North Carolina, Charlotte 5: Valentine A. Painter, P. O. Box 9243, 3805 Miriam Drive. Phone EDison 2-7987

Oklahoma, Tulsa 1: Joseph E. MacHale, P. O. Box 515

Tennessee, Nashville 6: James F. Logue, 1112 Inglewood Drive. Phone COngress 2-2488

Texas, Dallas 2: Robert E. Harris, 520 Second Unit, Santa Fe Bldg. Phone RI 7-7858

Virginia, Richmond 26: I. H. Garrison, 6816 Monument Ave. Phone AT 2-3086

MORTON SALT COMPANY, 110 N. Wacker Dr., Chicago 6, Ill.

North Carolina, Charlotte 7: J. M. Culp, 1212 Johnston Bldg.

Texas, Dallas: Ernest Peters, 6531 Glendora Ave.

NALCO CHEMICAL COMPANY, 6226 West 66th Place, Chicago 38, Ill.

Alabama, Mobile: R. T. Powers, P. O. Box 7085. Phone GReenwood 8-3981

Florida, Jacksonville 11: T. G. Cocks, P. O. Box 8124, 268 Noble Circle West. Phone RAymond 4-3834

Missouri, Kansas City 15: A. F. Diehn, 9407 High Drive. Phone MItchell 9-0992

Oklahoma, Tulsa 5: J. A. Rush, 1311 E. 38th St. Phone RIverside 2-3717

Tennessee, Knoxville 19: C. J. Sartorius, 704 Cherokee Blvd. Phone 8-2382

Texas, Houston 25: J. E. Starry, 1020 Holcombe Blvd. Phone JAckson 8-7695

NAUGATUCK CHEMICAL, DIVISION U. S. RUBBER CO., Elm Street, Naugatuck, Conn.

Florida, Montverde: P. S. Arey, P. O. Box 123. Phone HObart 9-2361

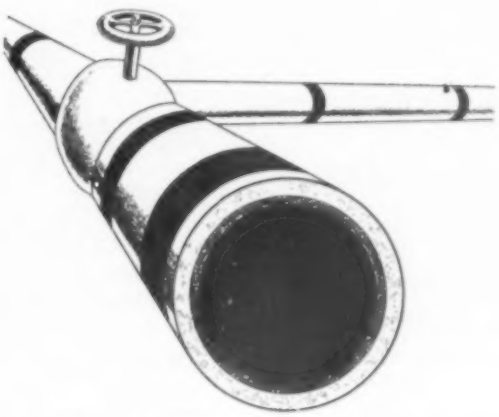
North Carolina, Gastonia: T. D. Ramsey, 214 West Ruby Ave. Phone UNiversity 4-3411

Tennessee, Memphis 7: J. M. Bolt, 1480 N. Thomas St. Phone JAckson 7-2411

NIAGARA FILTERS DIVISION, American Machine and Metals, Inc. East Moline, Ill.

Georgia, Atlanta: W. C. Davis & Associates, 1371 Peachtree St., N.E. Phone TRinity 5-9658

Texas, Houston: Shaw Engineering, Inc., 2401 Dunstan Road. Phone JAckson 9-4598



THE NORTH AMERICAN MOGUL PRODUCTS COMPANY, Standard Bldg., Cleveland 13, Ohio

WM. W. NUGENT & CO., INC., 3440 Cleveland St., Skokie, Ill.

Texas, Houston 27: T. F. Hudgins & Assoc., Inc., 3202 Mercer St. Phone JAckson 9-4165

OZARK-MAHONING COMPANY, 310 West Sixth St., Tulsa, Okla.

Oklahoma, Tulsa: C. J. Douglas, 1759 East 54th Place. Phone RI 7-5312

PENFIELD MFG. CO., INC., 19 High School Ave., Meriden, Conn.

THE PERMUTIT COMPANY, a Division of Pfaudler Permutit Inc., 50 West 44th St., New York 36, N. Y.

Florida, Coral Gables 34: G. H. Dacy, P. O. Box 34-472. Phone HIghland 5-2841

Florida, Jacksonville 4: W. P. Schomaker, 704 Gilmore St. Phone ELgin 3-3725

Georgia, Atlanta 5: H. H. Morrison, 3131 Maple Drive, N.E. Phone CEdar 7-3321

Louisiana, Baton Rouge 6: H. S. Bourgeois, Jr., 4543 North Boulevard. Phone DIckens 3-5080

Maryland, Silver Spring: D. M. McKee, 8605 Cameron St. Phone JUniper 9-3731

North Carolina, Greensboro: C. R. Poore, 431½ Walker Ave. Phone BRoadway 4-4843

Tennessee, Chattanooga 3: M. Scott, 848 McCallie St. Phone AMherst 6-4544

Texas, Houston 4: N. A. Voss, 4101 San Jacinto St. Phone JAckson 3-1498

THE PEROLIN COMPANY, INC., 350 Fifth Ave., New York 1, N. Y.

Alabama, Birmingham 11: G. P. Randol, 904 Sixth Place S.W. Phone STate 5-7057

Florida, Miami: M. Harry Coe, 3860 Battersea Road. Phone MOhawk 1-4804

Kentucky, Fern Creek: George Parnson, 8705 Michael Edward Drive. Phone CEdar 9-7193

Louisiana, Metairie 20: B. W. Farrell, 1140 Helois Ave. Phone JAckson 2-8291

Missouri, University City 30: E. H. Ronsick, 7724 Balson Ave. Phone PArkview 7-8798

North Carolina, Cary: Howard Waff, Jr., P. O. Box 85. Phone HO 7-9566

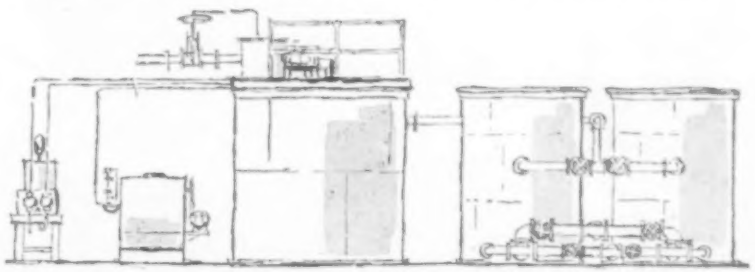
Oklahoma, Oklahoma City: R. E. Cleveland, 3321 N.W. 18th St. Phone WIndsor 3-4890

Tennessee, Nashville: F. H. Mefford, Maxwell House Hotel. Phone ALpine 5-2112

Texas, El Paso: Geo. S. Thomson, Inc., 611 N. Campbell St. Phone 3-4471

Texas, Houston 21: Carl Busch, 5827 Southgood. Phone MIssion 9-6039

Texas, San Antonio: C. P. Lobb, 270 Koehler Court. Phone LEhigh 2-2886



Industrial Water Treatment Reference Guide for the South-Southwest . . . .

PHILADELPHIA QUARTZ COMPANY, Public Ledger Bldg., Philadelphia 6, Pa.

Georgia, Atlanta 6: Richard D. Greenway, 1732 Wilmont Drive, N.E. Phone MElrose 4-0195

ROBERTS FILTER MANUFACTURING CO., 6th & Columbia Ave., Darby, Pa.

Virginia, Richmond 19: Shultz & James, Inc., 9 E. Cary St. Phone MIlton 4-3021

ROHM & HAAS COMPANY, Washington Square, Philadelphia 5, Pa.

Kentucky, Louisville: M. R. Collins, Room 508, 310 W. Liberty St. Phone JUniper 7-6679

Missouri, St. Louis 17: W. Wallman, 2200 S. Brentwood Blvd. Phone WOodland 1-0287

North Carolina, High Point: C. L. Smith, 912 Centennial Ave. Phone 5-1595

Tennessee, Memphis 2: J. J. Weitz, P. O. Box 2701, DeSoto Station, 137 E. Calhoun St. Phone 5-3757

Texas, Dallas 6: G. Clark, 6300 N. Central Expressway. Phone EMerson 3-1683

E. C. SCHLEYER PUMP COMPANY, INC., P. O. Box 106, Anderson, Indiana

SOUTHERN WATER CONDITIONING INC., 301 15th Ave., South, St. Petersburg 1, Fla.

Florida, Bradenton Beach: Ralph L. Brown, Brown & Coder, 3605 Gulf Drive. Phone 9-2884

Florida, Jacksonville: R. J. Mack Company, 5706 Milmar Drive South. Phone RA 5-5433

Florida, Pompano Beach: K. L. Diller & Associates, 2707-A East Atlantic Blvd. Phone WHitehall 1-2706

Florida, Sarasota: H. F. McCann, P. O. Box 3836. Phone RIngling 7-3333

Florida, Tallahassee: Joe Shealy, 1340 Linda Ann Drive

Florida, Venice: Carl Lemnitzer, P. O. Box 753. Phone 2-8831

Georgia, Atlanta: Homer W. Parker, 55 Fayetteville Road, N.E. Phone DRake 3-7579

Georgia, Brunswick: Barney Riley, 428 Newcastle St. Phone AM 5-5360

North Carolina, Durham: Henry P. Leighton, Route 1, Box 106-A. Phone 7-6948

SPARKLER MANUFACTURING COMPANY, Water Sales Division, 101 Cartwright Road, Conroe, Texas

Florida, Miami: Joe Goodie, 1840 S.W. 11th St. Phone HIghland 6-2474

Louisiana, Metairie: S. G. Davis, P. O. Box 9053. Phone CEdar 9093

Missouri, St. Louis 1: F. S. Crook Co., 1004 Market St. Phone CHestnut 1-3511

North Carolina, Charlotte: Len Bowles, 3401 Shamrock Drive. Phone KEystone 7-4533

Oklahoma, Tulsa: James E. Dyer, P. O. Box 1226. Phone LUther 4-1076

Tennessee, Chattanooga: A. G. Brown Company, P. O. Box 4121. Phone AMherst 7-8174

Tennessee, Memphis: Peyton L. Hoshall, Hoshall Machinery Co., P. O. Box 244. Phone JAckson 6-2052

Texas, Conroe: Sparkler Manufacturing Co. Phone PLeasant 6-4471

Texas, Tyler: R. E. Layton, Jr., Layton Engineering Co., P. O. Box 247. Phone LY 3-8213

STRONG, CARLISLE & HAMMOND COMPANY, Borgana Water Treatment Division, 508 Sandusky St., Conneaut, Ohio

Alabama, Birmingham 9: P. Hayden, 210 Hollywood Blvd.

D. C., Washington: L. C. Rodeno, Room 628, Burlington Hotel. Phone CO 5-4000

Florida, Orlando: Industrial Equipment Co., P. O. Box 7776, 2500 Silver Star Road.

Georgia, Macon: J. W. Jones, 2810 Cherry Ave. Phone SHerwood 5-8978

North Carolina, Burlington: H. D. Kester, Jr., 1115 Willow Brook Drive. Phone CA 7-2850

Texas, Houston: R. D. Paige, 5610 Royal Palms Drive, Apt. 75. Phone OLive 4-4553

WALLACE & TIERNAN INCORPORATED, 25 Main Street, Belleville 9, N. J.

Florida, Jacksonville 2: J. R. Hoy, 401 First Federal Savings Bldg. Phone ELgin 3-0373

Georgia, Atlanta 9: M. E. Henley, 1841-R Cheshire Bridge Road, N.E. Phone TRinity 6-4431

Missouri, Kansas City 8: F. A. Martin, 2800 Cherry St. Phone VAlentine 1-5438

Missouri, St. Louis 10: H. N. Morrison, 2319 Hampton Ave. Phone MIssion 7-3215

North Carolina, Charlotte 4: J. H. Henderlite, P. O. Box 4055. Phone EDison 4-4095

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Problems Encountered Air Conditioning an Existing Building

By GEORGE H. WATSON
Birmingham, Alabama

PROBLEMS which must be solved when an existing building is air conditioned (with all the muss involved) are related by J. C. Blakey, superintendent of the Jefferson County Courthouse in Birmingham, Ala.

The building was erected in 1932 at a cost of about $3,000,000. At that time air conditioning was not thought of and no provision was made for it except that a type of ventilation was provided for the courtrooms. However, as the years wore on and need and desire for air conditioning became more pronounced the County Commission finally came up with the funds (some $900,000) needed for the air conditioning. Naturally this involved considerable worry to the building superintendent as to how to keep operations going on in the various offices and at the same time go ahead with the construction necessary to install a comprehensive central air conditioning system with some 180,000 pounds of ductwork.

Usually in bidding on air conditioning or other remodeling jobs in buildings of this type the original plans of architects and engineers are used as a basis. However, very few buildings are ever erected exactly as designed and planned. Consequently the air conditioning contractor runs into beams, conduits, water lines, and new walls, not shown on the plans. What may be figured as a straight run of duct may end up a mass of offsets before the contractor completes installation.

J. C. Blakey, superintendent of building, looks over plans for the air conditioning job.

View showing one of the 300-ton Carrier compressors being put in place. Another one is being snaked into place in the background.

On such a job tenants and personnel in the building definitely must be taken into consideration. As a result workmen may be required to give direction to visitors, explain the system to the curious, listen to sidewalk superintendents, make as little noise as possible, watch their language, keep hallways cleared, clean up, and most important of all see that no one is hurt.

Storage problems may become terrific on a job of this sort, making it necessary to use spaces remote from where the actual construction is being done. Certainly hallways which tenants and their customers use cannot be blocked. This decentralization of materials can cause loss of time and material.

While ducts were being installed in various hallways and outlets constructed in the rooms it was necessary to keep premises cleaned up as far as possible and to protect furniture with drop cloths. A policy was followed of taking one floor

Ductwork being installed in corridor.

View showing pipe tunnel in the building.

and a section at a time, so that a given area would not be torn up any more or any longer than necessary.

Planning

On this particular job extreme planning had to be done, so as not to interfere with the courtrooms. The contract was let May 23 and the courts were recessed June 20, giving exactly four weeks in which to make shop drawings and prepare submittals before actual work started. Courts were then re-convened Sept. 8, leaving but 11 weeks in which to install air conditioning on the courtroom floors.

With such a schedule it was necessary for the contractor to assign layout, fabrication and erection men just for that job. Three shifts were utilized part of the time. In order to speed up the job, the contractor used "Fastak" duct insulation adhesive and the Airolite Company adjustable louvres with fusible link.

The only thing resembling air conditioning in the courthouse as originally erected was a gravity heating and ventilating system for the 16 courtrooms. By this means fresh air was injected into the rooms and in the winter it was tempered by means of steam coils at the point of intake.

By clever design, the engineer worked the ductwork for this old heating and ventilating system into the new air conditioning. Multi-zone units were placed on the ground floor, bringing in outside air as before, preheated in winter, and sent up the existing individual ducts to the courtrooms.

Return air fans were added in the pipe space between the sixth and seventh floors to return the air from the courtrooms through existing ducts. The air is then filtered and deodorized (by means of activated carbon odor removing filters) and sent down the pipe shafts on the north and south ends of the building into equipment plenums on each floor. There are two air handling units on each floor — one on each end serving that area other than the courtrooms.

This recirculation of air is a feature of the installation, which was incorporated because the courtrooms need a large volume of conditioned air when court is in session but much less when not in session.

All precautions were taken to prevent any noises being carried into the courtrooms. Walls of the equipment rooms were insulated, supply ducts were insulated to the existing risers and in the courtrooms. Eighteen-foot-long diffusers were used overhead in the courtrooms in order to spread the air and eliminate any possibility of noise at the outlets.

Checking Ducts

Since existing ducts were used, and knowing that installations are not always as shown, it was necessary to trace the lines. This was done by exploding smoke bombs in each duct on the ground floor and allowing the smoke to flow by gravity to the courtrooms. The smoke bombs were products of E. Vernon & Hill Company.

Mechanical Equipment

Space for the two hermetically sealed Carrier centrifugal compressors, each of 300 tons capacity, was made by taking out one of the three existing steam boilers in the basement. This boiler was used mostly for paper and refuse burning. A new incinerator was installed. The building is heated by the two remaining steam boilers which are fed by pulverized coal. The summer air conditioning is entirely separate, except that steam is used to temper the air in the units that ventilate the courtrooms in winter.

A hole about 20 feet square was cut in the basement courtyard floor, so the new compressors, 20 feet long and weighing 2,000 pounds each, could be eased into position. This opening was used during the construction to accomodate a conveyor for waste. A removable covering was placed on it for possible future use in moving heavy equipment.

Ceiling height in the corridors was such that the new ductwork could be laid against the old ceiling and furred-in, still leaving 9-feet headrooms.

The architect was Charles McCauley, and the consulting engineer was James A. Evans. G. W. Hallmark and Sons were general contractors. Hardy Corporation was the air conditioning contractor. All these are Birmingham concerns.

Two "Firsts" for Computer Control

Carolina Power & Light Company

A WORLD'S "FIRST" is in the making at Carolina Power & Light Company's Goldsboro steam-electric generating plant.

A new 320,000-horsepower generating unit slated there in 1962 will be controlled by an electronic device which will not only monitor and record data, but, when "educated," will actually operate the unit from a storehouse of memory data in its electronic brain.

The new device is called SPARC — Steam Power Automation and Results Computer. It will be the first ever installed in a coal-fired steam-electric generating plant. The new unit will be engineered and designed by Ebasco Services, Inc., with automation by Daystrom, Inc.

Once filled with memory data, SPARC will do wonders. The computer programming will permit immediate response to all operating conditions in the unit. It will operate the boiler and turbine-generator, and measure and record their efficiency. It will prepare operating records for the plant's history file. It will provide protection through instantaneous response to pre-arranged "danger signs" in the unit's operations. When conditions dictate, it will automatically shut the unit down. When trouble is cleared, it automatically will return the unit to service. Like a good servant, it also will relinquish its control upon command to the human master.

H. B. Robinson, vice-president and general manager of CP&L said, "The new automatic generating unit will be the largest and most costly we have ever installed. Complex, simultaneous functions are so numerous that even the best-trained operators cannot perform them quickly enough for maximum efficiency and protection of equipment in case of trouble.

"These factors prompted us to include SPARC in the new unit's design. It will respond to anticipated situations with electronic speed and mechanical accuracy."

Advantages of SPARC are many, he said: performance of myriad control combinations with electronic speed and accuracy; immediate response to varying conditions; rapid decision-making that could prevent losses of millions of dollars in the event of machinery malfunctions; shortening of plant outages by unerring response to pre-arranged shut-down and start-up commands; and reduction of fuel costs through more efficient operation.

Mr. Robinson said SPARC will not cancel the human element at the Goldsboro unit. On the contrary, he added, it will require human intelligence to prepare the computer's memory data, put the machine into operation, check it, and carry out usual maintenance required.

Gulf States Utilities Company

RECENTLY announced by Allis-Chalmers is a contract to modernize an existing power plant of Gulf States Utilities Company for operation with computer equipment. Gulf States is the first power company to apply computer control to an existing station.

When completed, the Riverside Power Station (Lake Charles, La.) will have the necessary controls to allow two Allis-Chalmers turbines — a 35,000 and a 40,000-kw unit — to be automatically started when required for peak loads and shutdown as the load decreases. The computer will continuously calculate the heat rates of the station so that the plant can be automatically regulated at all times to maintain desired conditions.

At this time, **J. A. Reich,** Production Manager of Gulf States Utilities Company said, "It is merely a matter of backfeeding the circuit, and the automatic station is in our immediate reach."

As prime contractor for the "Systemation" project, Allis-Chalmers will design, furnish and install the complete system for automatic control. The present design of the turbines and associated equipment will be extended to facilitiate computer control.

Modifications to the turbines will include the addition of a wide range governor to control the turbine speed setting from turning gear speed to operating speed. Thermal expansion and bearing vibrations will be measured by detectors and logged by the computer. These and other signals can be printed on trend recorders for visual observation by the operator. Thermocouple signals from temperature detectors in the journal bearings, thrust bearings, hydrogen seals, and generator will be used as a guide in establishing maximum rates of load change.

An important feature of this new control system is the increased safety, flexibility and reliability.

The instrumentation and data processing system necessary for computer operation of the facility will be designed and manufactured by Consolidated Systems Corp. (Monrovia, Calif.), an associate company of Allis-Chalmers, Bell & Howell and Consolidated Electrodynamics. The new equipment is expected to be in service before the end of next year.

In addition to the turbo-generators, the new plant modifications will include automatic control for startup, sensing, measuring and controlling temperatures and flow in boiler, condenser, heaters, pumps and electrical distribution system. Additions will be made in the area of safe operation for combustion and fuel safety in the steam generator. An important adjunct will be the maximum possible reduction in startup time from cold shutdown to full load.

A New Way to Cover Insulation

UNTIL RECENT YEARS insulation on boilers, ducts, and other steam generating equipment was usually covered or lagged with cement and a couple of coats of paint. Cement lagging has two drawbacks. Heat and aging usually produce cracks, and cement is highly vulnerable to mechanical damage.

On the other hand, any material that replaces it has to overcome these disadvantages, yet be easy to fabricate and competitive in cost. Frequently, there is still another qualification — attractive appearance.

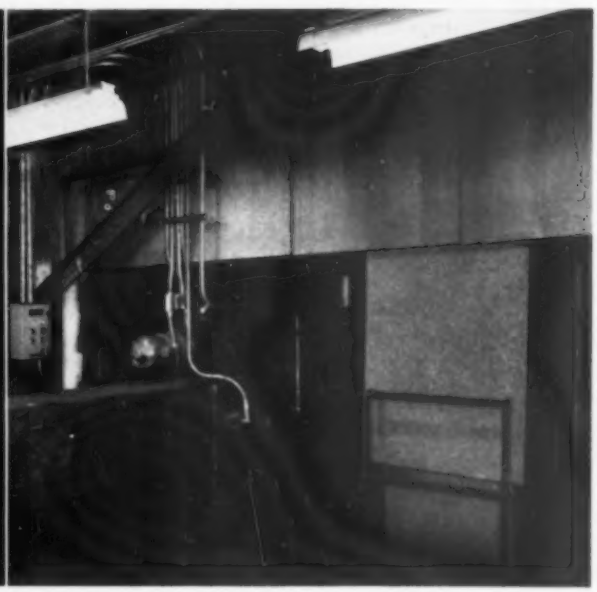
A readily paintable surface for good appearance was a prime consideration in the choice of material for more than half a million square feet of lagging on the Thos. H. Allen Electric Generating Station in Memphis, Tennessee. The design engineers wanted all lagging painted, both inside and outside the station. But they also wanted the additional corrosion protection of a zinc coating. Armco Zincgrip-Paintgrip met these requirements.

Regular galvanized sheet steel would have required special surface treatment before painting, a difficult and costly job, with over a half-million square feet of surface. The special treated zinc-coated steel was ready for immediate painting when it left the mill. Its surface is chemically treated to take paint immediately and preserve it longer.

Officials at the Jamar-Olmen Construction Company, who fabricated and installed this mammoth lagging job, reported that the special steel proved exceptionally easy to work. They also discovered an unexpected advantage that speeded erection. Layout patterns drawn on the surface showed up especially well when the pieces reached the job site, simplifying assembly.

Reportedly one of the largest installations of its type anywhere, 550 tons or more than a million pounds of the Armco special steel was fabricated into lagging for this one power generating station in Tennessee.

The special zinc-coated steel lagging on section of boiler is shown ready for painting (Lower Right). Unusual configuration creates no fabrication problems (Right) because steel can be severely formed with no flaking or peeling of the coating. Despite the extensive fabrication required (Below) the tightly adhering zinc coating provides a smooth surface for painting.



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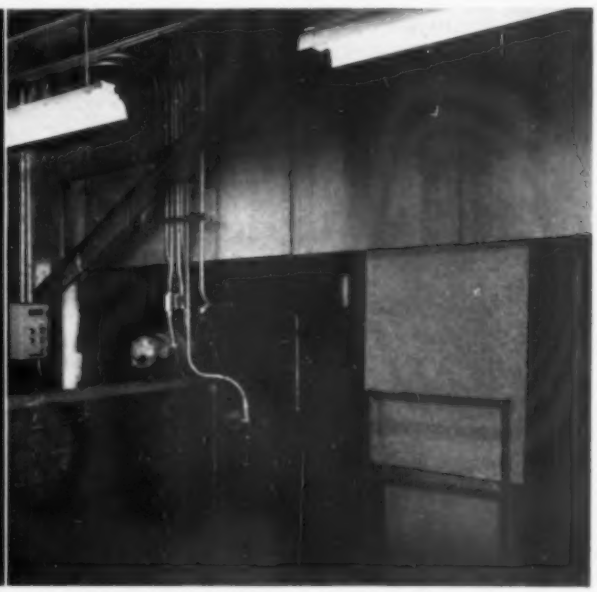


MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Is an Employees' Recreational Center Desirable?

Question . . . . . .

OUR COMPANY has some land, presently not needed for our manufacturing operations. A suggestion has been made that we turn this vacant land into an employees' recreation area with a nine-hole golf course, a playground for the children, shuffle-board courts and eventually a club house.

The Personnel Department favors the idea from the viewpoint of good employee relations, anticipating that such a facility would improve employee health, spread individual acquaintanceships throughout the Company, and generally improve morale.

On the other hand, we also are fearful of being accused of paternalism by the Union, and possibly running into a future problem should we need the ground for factory expansion. Have you any suggestions for handling this kind of situation?

Suggestions . . . . . .

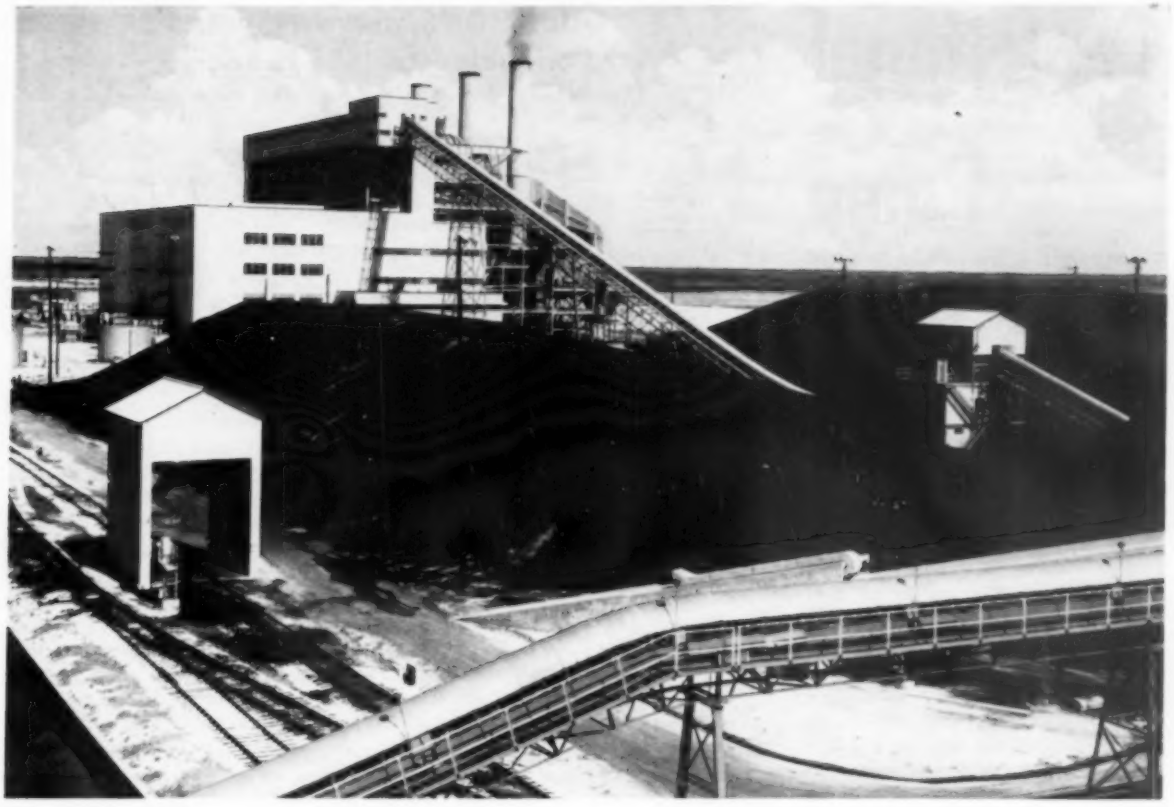
THE PRIME QUESTION to be answered here, is whether the land can be, or can't be, permanently released for recreational use. If the answer is negative, a scheme that has been successful in various industries, is this: The employees are told that, if they wish, they may set out their own golf course, tennis courts and so on, with the understanding that factory expansion has a priority right to displace them at any time. In these instances, the Company follows a strictly-hands-off policy, contributing nothing but the permission to use the vacant ground, and exercises no jurisdiction over the administration of the area. The whole thing is placed squarely in the hands of the employees.

If the ground *can* be given over permanently to recreation, Management may or may not elect to contribute to the development of the area. Charges of paternalism need not be risked if the plan is presented to the Union before it is activated, and if, furthermore, administration of the area is delegated to an employees' committee elected for that purpose.

In any event, the creation of a recreational facility generates two characteristics of interest to Management. First of these is, it won't benefit all employees. Likely, only those who find in it an outlet for their particular hobbies and sports will use it. Many won't patronize it because to a large extent, it projects their contacts with supervisors beyond the normal working day, and these people usually want to be free of the boss in their own hours, even though he has no jurisdiction over them when they are off duty.

A second characteristic is that recreational projects, on a permanent site particularly, tend to develop an institutional need for money. This or that inevitably calls for renewal or replacement, or just a little expansion is considered beneficial. So somebody pays.

Whether these projects actually are worth their cost is a moot question. We doubt it, but many managements take the opposite view.



Tampa Electric Company Burns Coal in 435,000 Kw Plant

New 175,000 Kw Unit for Gannon Station

A NEW POWER generating unit has been completed and is now in operation at Tampa Electric Company's Francis J. Gannon Power Station.

The new unit, 175,000 kilowatts in capacity, is the third unit at Gannon — the largest coal-fired power station in Florida. This unit is the largest of the three units at Gannon, and is almost three times as large in itself as the company's entire generating capability as late as 1947.

The first unit at Gannon went into operation in 1957, and the second unit was added the following year. Each of these units is rated at 130,000 kilowatts with the addition of the third unit, the Gannon Station is now capable of generating 435,000 kilowatts of electricity.

Tampa Electric also operates two older generating stations, Peter O. Knight and Hooker's Point, with 65,000 and 235,000 kilowatts capacity, respectively. Both of these plants are fuel-oil fired.

With the addition of the third Gannon unit, Tampa Electric's generating system now has a total capability of 735,000 kilowatts — an increase of over 1,000 per cent since 1947.

With the completion of the third unit at Gannon, Tampa Electric now has an investment of some 53 million dollars in this plant. This investment is more than the company's entire plant and equipment investment in 1952.

The Gannon Station consumes an average of 2,600 tons of coal each day to provide electric service for Tampa Electric's customers. The plant provides over two-thirds of the requirements of the firm's service area.

The major equipment for a fourth generating unit at Gannon Station, this one 190,000 kilowatts, has been ordered. Plans are for this unit to be completed and in operation in 1963.

W. C. MacInnes, President of Tampa Electric, stated that the company plans to add more units at Gannon in the years to come. He said that this station's generating capability will approximate 1,000,000 kilowatts by 1970.

Also, Tampa Electric recently announced the purchase of a tract of land on Hillsborough Bay north of Ruskin for the construction in the late 1960's of a fourth generating station. This station will be similar to the Gannon Station.

Centrifugal Pump Clinic

QUESTIONS and ANSWERS
Conducted for SPI Readers

By **IGOR J. KARASSIK**
Consulting Engineer and
Manager of Planning
Harrison Division
Worthington Corporation

A Pump for Varying Loads?

QUESTION:

IN CERTAIN PUMP applications, as in refineries, it often happens that the flow through a pipe system is increased over the original conditions, sometimes by several hundred per cent. In a recent conversation it was suggested that the pumps which serve a distribution system of this kind could be adapted to the throughput variations by providing suitable inserts in the housing. The impeller, of course, would remain unchanged.

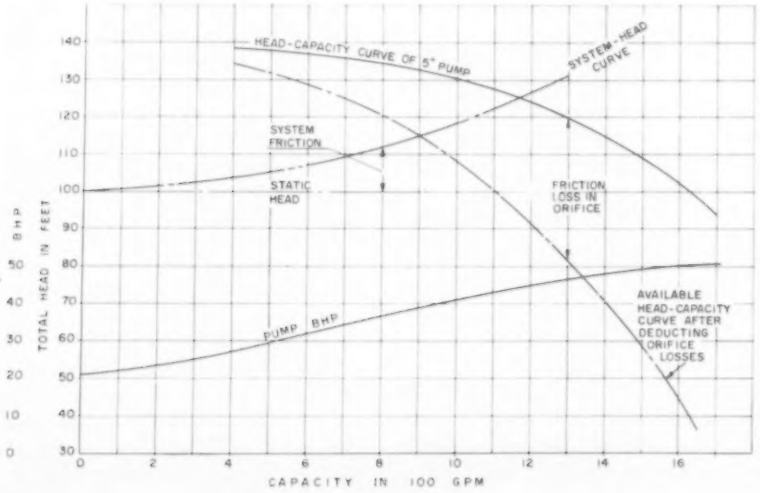
ANSWER:

THE METHOD of increasing throughput in a pumping system that you describe seems a bit "faulty" to me, for several reasons. If the piping system remains unchanged, even doubling the capacity (let alone increasing it several hundred per cent) would make the pump incapable of developing the increased total head requirements.

Let us assume, for instance, that of the total head developed by a pump to meet initial service conditions, 80% goes to overcome static head differences and the terminal static pressure, while 20% is the friction loss in the piping and valves.

Since friction losses vary approximately with the square of the flow, doubling the capacity would increase friction losses fourfold to 80% and the pump would now have to develop 160% of the total head against which it worked previously. Unless the impeller diameter or the pump speed were to be increased markedly, the pump obviously could not do this.

Fig. 1. Performance of 5" pump at 1750 rpm with orifice in discharge.



If I understand you correctly, the pump casing would be provided initially with some sort of filler pieces. Then, later, when a greater capacity was required, the filler pieces or portions of them would be removed. This would increase the pump casing area and — *by this theory* — increase the pump capacity correspondingly.

It is probable that some increase in capacity (*at the same total head as before*) would occur, but nowhere near as significant an increase as you imply. The casing areas are only partially responsible in establishing pump capacity; the pump impeller areas are much more of a factor. Thus, unless the casing is throttling the effect of the impeller excessively to begin with, no significant increase will take place merely by enlarging the casing areas. Even if a throttling action is taking place, a capacity increase of some 10 to 20% at most (at the same head, remember) can be expected.

A somewhat different means of varying pump capacity (without materially affecting the head) is the use of so-called 100% and 80% impellers. Standard lines of pumps in the medium and larger sizes — say 6" and above — are frequently designed to accomodate either of two impeller designs: a 100% impeller which fully loads up the casing and a narrower wheel designed for say 80% of the standard capacity. For instance, a pump designed to have its best efficiency at 5000 gpm and 200 feet may also have an impeller pattern which would have its best efficiency at 4000 gpm and 200 feet.

The basic purpose of this arrangement is to avoid building too many intermediate pump patterns and thus to reduce total develop-

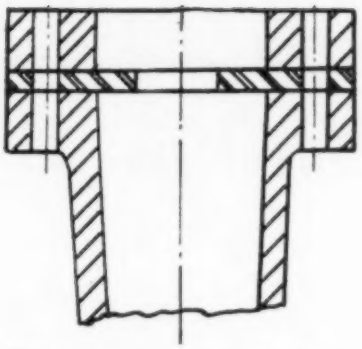


Fig. 2. Arrangement of capacity limiting orifice.

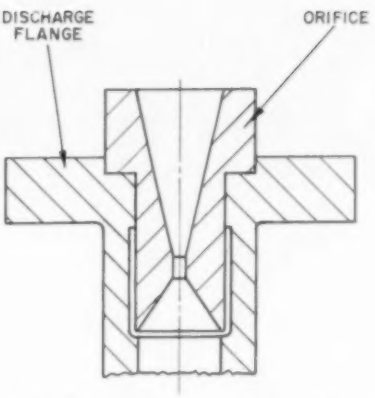


Fig. 3. Plug-type discharge orifice to modify the system head-capacity curve.

ment costs which, after all, have to be passed on to the customer. On occasion, it is possible to take advantage of this if the pump was fitted with an 80% impeller initially, by replacing it with a 100% impeller. However, a significant increase in capacity can only be achieved if the driver can carry the increased power requirements (or can be economically replaced) and if the head requirement of the system at the increased flow falls within the maximum head that can be developed with the maximum diameter in this casing.

It is also possible that you had heard of another arrangement which can be used to limit the capacity of a pump and pumping system combination so as to prevent severe driver overload.

Centrifugal pumps of low specific speed types generally have an "overloading" type of brake-horsepower curve; in other words, their power consumption continues to increase as the capacity increases and the total head decreases.

Even pumps whose bhp curve flattens out at some maximum capacity may overload their drivers if permitted to operate at capacities beyond their design capacities, unless the driver is selected to match the maximum pump bhp at any capacity.

For instance, referring to Fig. 1, if the pump was designed for 1000 gpm and 130 feet, the pump bhp would be 41. If the pump were never expected to operate beyond this 1000 gpm, a 40 hp motor could be used without incurring a very serious overload. But if under certain conditions, the total head of the system were permitted to fall appreciably below 130 feet at capacities in excess of 1000 gpm, the pump would operate at these higher capacities and the bhp might reach 50 or even higher, with serious effects on the motor life.

It is possible, however, to introduce a means of limiting the pump capacity whenever necessary to prevent possible operation at capacities where motor overload would occur. I suggested such means some years ago for standard close-coupled or frame mounted pumps normally built for stock in standard combinations. This means consisted of an orifice to be located in the discharge of a pump whenever it was sold for conditions warranting the use of a motor sufficient for normal operation but which would be overloaded at reduced heads. The effect of such an orifice (see Fig. 2) is illustrated on Fig. 1.

Let us assume that the operating conditions call for 900 gpm at 115 feet. The normal selection for these conditions would have required the use of a 50 hp, 1750 rpm motor. At 900 gpm this pump develops 133 feet and takes 39 hp. If 100 feet of the total required head was static and 15 feet represented the friction losses, we can construct our system-head curve and establish that the intersection of this system-head curve with the pump head-capacity curve would take place at 1170 gpm and 125 feet.

The pump brake-horsepower would be 44.5 and a 50 hp motor would definitely be required.

But if an orifice were installed in the pump discharge, such that it would absorb 18 feet of friction at 900 gpm, the pump capacity could never exceed this 900 gpm value nor the pump bhp exceed 39 and a 40 hp motor would be sufficient.

The curve was drawn up to indicate that the net pump head-capacity curve is reduced by the amount of 18 feet at 900 gpm and by a varying amount at other flows, proportional to the square of the capacity. Actually, the effect can be said to artificially increase the friction in the discharge piping by these same amounts and we could have drawn a new system-head curve.

In other words, the orifice does nothing that a manually positioned throttling valve would not do, except that it does it permanently or, at least, until it is removed. This eliminates the danger that an operator would inadvertently open the valve, increase the flow through the system and overload the driver.

The arrangement of the capacity-limiting orifices I had suggested is shown on Fig. 2. Each size pump was to have had a series of orifices of varying dimensions to be used for different operating conditions.

A more refined arrangement has recently been adopted by a refinery which is utilizing this principle to install a standardized pump on a variety of different services for different capacities and heads. The pumps are provided with a plug-type discharge orifice to modify the head-capacity curve available to the system. (See Fig. 3)

Obviously, the power consumed by the pump at any given capacity is that required to develop the normal total head and the friction loss through the orifice is a net loss. The user must evaluate this loss against the distinct advantage of using a single size pump on a multitude of different services and the ability to convert a pump to different conditions of service with at most a change of drivers.

You will find that such an evaluation may justify the use of an orifice in the discharge in the range of small pumps only, and generally only if the range between minimum and maximum capacities to which a given size pump is applied is not excessive.

The Engineering Profession Has a Stake in TECHNICAL INSTITUTE EDUCATION

By A. RAY SIMS
Dean, College of Technology
University of Houston,
Houston, Texas

MR. A. RAY SIMS was born May 9, 1909 at Urania, Louisiana. He attended grade school and high school in Texas. He received the Bachelor of Arts Degree in Mathematics from Hardin-Simmons University and Master of Science from the University of Houston. From 1930 to 1941 he was a teacher and administrator in various school systems of Texas.

He was Director of Training for Reed Roller Bit Company, Houston, Texas 1941-1944. In this capacity he supervised the training of thousands of employees for war production. He then became Training Advisor for the War-Manpower Commission for Texas, Louisiana, Arkansas, and New Mexico. In 1945 he became Dean of the College of Technology, University of Houston.

Mr. Sims has served as Chairman of Region VIII Committee for the National Survey of Technical Institute Education conducted by the American Society for Engineering Education under a grant from the Carnegie Corporation. He was appointed a member of the National Task Force on Technical Curricula by President Eisenhower's Committee on the Development of Scientists and Engineers.

Mr. Sims is the present Chairman of the Technical Institute Division, American Society for Engineering Education, and a member of the National Committee. He is also Vice-Chairman of the Sub-Committee on Technical Institute Accreditation for the Engineers' Council for Professional Development and Chairman of Region VI.

THIS ARTICLE will point out some of the forces that affect educational institutions that are engaged in the training of engineering technicians, and suggest some measures that the engineering profession can undertake to create a healthier atmosphere in which those institutions can grow and serve better the whole field of engineering.

Status

The problem of *status*, or should I say lack of status, is probably the strongest single force influencing the "technical institute idea" in higher education. Upon it, or the lack of it, hinges the decision of many fine young men, having great aptitude and interest in the so-called "practical" aspects of engineering, to forsake their natural desires and to undertake a Baccalaureate curriculum in engineering or, worse still, in some entirely unrelated curriculum. Such decisions are likely to result in a great deal of frustration and disappointment, not only to the students themselves but to their parents, their teachers, and ultimately their employers.

Pressures from parents, friends, teachers, and vocational advisers all too frequently point to the obtaining of a Bachelor's Degree, regardless of the area in which it is obtained, as the "open sesame" to social and vocational success.

I submit that all too frequently the earning of a Baccalaureate Degree signifies only that the recipient has exercised caution in the selection of a college and exceptional diligence in the selection of his individual professors and not that he possesses necessarily a high degree of professional competence.

On the other hand, the holder of an Associate Degree from an accredited technical institute may, because of the specialized training that he has received, make a much greater contribution to society than his counterpart with the Baccalaureate Degree.

In spite of all this, however, the lack of such a Degree too frequently relegates him to second class status in the minds of his associates and his employer.

Engineers Can Help

Cannot we as engineers view our profession in the light of its total requirements and not as a series of entirely unrelated segments? Cannot we regard it as a team occupation with each member of the team contributing to the activities and functions for which his interest, aptitude and training best qualify him?

Cannot we, as President Eric Walker of Pennsylvania State University pointed out recently in an address before the American Society for Engineering Education, realize that engineering requires both *thinking* and *doing*? Why not recognize the fact that the thinker renders his greatest service by taking a problem and resolving it to a set of abstractions in order to reach a solution, whereas the doer is best fitted to take these abstractions and, by applying known technologies to them, convert them into useful products?

Cannot we recognize that both thinking and doing are essential and that no less relative status should be accorded a person because he is better at doing than at thinking?

I suggest that the engineering profession can do a great deal to overcome the status barrier by undertaking, through its profes-

sional societies, an action program of acquainting its members and the public with the "technical institute idea" in higher education and by working toward the development of career opportunities for engineering technicians, just as the medical profession has provided career opportunities for medical technicians, X-ray technicians, and laboratory technicians.

This country cannot afford to continue to be as extravagant with its technical talent as it has been in the past. We must develop a much wider usage of engineering technicians and provide a climate in which these people can grow and make a career for themselves.

The engineering profession, through the *Engineers' Council for Professional Development*, has done a great deal toward improving technical institute curricula through its accreditation procedures but has done very little toward improving the status of the *graduate* of such an institution. The NSPE currently has under study a program of certifying engineering technicians which, if instituted, would give these graduates an atmosphere in which to grow. Such a program merits the support and cooperation of all of the engineering societies.

Lack of Understanding

Another sociological and political force impinging upon technical institutes is that of lack of understanding of what is meant by technical institute education. If an engineering educator were asked to define it, he would probably describe it as being "vocational," whereas a person engaged in technical institute work would probably insist just as strongly that it isn't. On the other hand, if you were to ask a person engaged in the training of skilled mechanics to describe his program, he would probably say that he was training technicians.

Through some process of usage, the word "vocational" has grown to mean something not quite respectable as far as higher education is concerned. But if we take it to mean the acquisition of those skills and competencies by which a person earns his living, then it becomes an integral part of higher education. In this sense the training of the engineer, the lawyer, the doctor as well as the bricklayer, the carpenter, and the technician is vocational.

The Engineers' Council for Professional Development, on the other hand, defines a curriculum for the training of engineering technicians as follows:

1. The purpose is to prepare individuals for various technical positions or lines of activity encompassed within the field of engineering, but the scope of the programs is more limited than that required to prepare a person for a career as a professional engineer.
2. Programs of instruction are essentially technological in nature, based upon principles of science and include sufficient post-secondary school mathematics to provide the tools to accomplish the technical objectives of the curricula.
3. Emphasis is placed upon the use of rational processes in the principal fundamental portions of the curricula that fulfill the stated objectives and purposes.
4. Programs of instruction are briefer, and usually more completely technical in content than professional curricula, though they are concerned with the same general fields of industry and engineering. They normally lead to the appropriate Associate Degree. Graduates of such programs are commonly designated as Engineering Technicians.
5. Training for artisanship is not included within the scope of education of technical institute type. This is interpreted as excluding curricula for which support is received from Government funds supporting vocational education.

Special notice should be taken of the last sentence under point five because around it hinges a controversy that is creating much misunderstanding and ill will and will continue to do so unless it is resolved. The following excerpts from the National Defense Education Act will indicate the reasons for the confusion.

> . . . It is therefore the purpose of this title to provide assistance to the States so that they may improve their vocational education programs through area vocational education programs approved by State boards of vocational education as providing vocational and related technical training and retraining for youths, adults, and older persons, including related instruction for apprentices, designed to fit them for useful employment as technicians, or skilled workers in scientific or technical fields.
>
> . . . That funds appropriated under section 301 of this title shall be used exclusively for the training of individuals designed to fit them for useful employment as highly skilled technicians in recognized occupations requiring scientific knowledge, as determined by the State board for such State, in fields necessary for the national defense.
>
> . . . The term 'area vocational education program' means a program consisting of one or more less-than-college-grade courses conducted under public supervision and control and on an organized, systematic class basis, which is designed to fit individuals for useful employment as technicians or skilled workers in recognized occupations requiring scientific or technical knowledge, and which is made available to residents of the State or an area thereof designated and approved by the State board, who either have completed junior high school or, regardless of their school credits, are at least sixteen years of age and can reasonably be expected to profit by the instruction offered.

Complications and Confusion

From the foregoing excerpts from the National Defense Education Act and the Twenty-Seventh Annual Report of the ECPD, the reasons for the controversy mentioned previously are more apparent. Even though the terminology is similar, there is a vast difference in the type of educational program that would qualify for Federal support under the terms of the National Defense Education Act and one that would merit accreditation by the ECPD.

To complicate the matter still further, the United States Office of Education interprets the term "less than college grade" as meaning courses that do not necessarily apply directly toward a Bachelor's Degree rather than as connoting the academic level of the course.

Is it, then, any wonder that there is confusion in the minds of the public when trying to properly place the technical institute in the academic hierarchy? Surely, the engineering profession can use its influence to help clarify these conflicts and to bring a semblance of order out of the disorder now existing.

Waste Treatment

(*Continued from page 20*)

a summer month are shown in Table 1.

On the normal operating weekday the average flow to the plant is about 2.5 mgd; of this flow about 60 per cent is textile waste and about 40 per cent is domestic sewage.

There are three modifications in the design of the plant which will be emphasized.

The first of these is that we do not neutralize the very highly alkaline waste. The average pH of 11.5 entering the plant is much higher than that of a normal sewage plant. We maintain this high pH by feeding caustic waste from the storage lagoon on a 7-day basis rather than direct from the bleachery as it is discharged.

The second modification is in the BOD loading applied to the filters. The average BOD entering the plant, when the bleachery is in operation, is usually between 1800 and 2000 ppm. The normal BOD loading for the design of a filter is 2 lb of BOD per cu yd of stone. We designed our filter for 4 lb of BOD per cu yd of stone. In the regular summer operation of the filter the BOD loading is in the range of 7 to 10 lb of BOD applied per cu yd of stone. Actual removal of 4 to 5 lb of BOD per cu yd of stone has been obtained.

The third modification is in digester capacity. The sludge from the starch waste decomposes very rapidly and produces large quantities of methane gas. Digestion is accomplished in about 10 days rather than the normal 30-day period. This rapid digestion and scum control is aided by recirculation of supernatant through inlet pipes in the floating cover. The temperature of the digesters is maintained between 95 and 100 F.

Treatment Varies

The waste-treatment method employed at Kannapolis is not a new process. It is an established treatment method that has been modified to fit the needs of this particular textile plant. The modifications were indicated in our laboratory studies, and actual plant-scale experiments showed them to be practical.

There are many cases where industries and municipalities would both benefit if cooperative studies of their waste problems were undertaken. The solution would often reduce the cost to both.

Research by the textile industry has provided methods of treatment for almost all of the textile waste being discharged. This information is available in the literature and I will not attempt to go into detailed treatment methods. The problem is very complex and each individual case should be studied on its own merit.

The smaller mills can often have their wastes treated by a municipality. In many cases no pretreatment is necessary. However, there are cases where regulation of flow, reduction of temperature or chemical pretreatment would be necessary. These requirements are often necessary for the successful operation of a biological treatment plant. However, they should not be imposed on an industry unless they are necessary. The problem is one of cooperation between the industry and municipality if the best solution is to be found.

The small plants that are not located in or near municipalities should employ qualified consultants to study their waste problems and to design their waste treatment facilities.

The very large industries usually have the experienced personnel to solve their own waste treatment problems. Treatment of their own wastes is very often more economical, especially if the municipalities involved have a surcharge for excessive BOD content. This excessive BOD, in textile waste, is usually in the sizing and is readily treated with biological processes.

The chief problem for an industry is to provide 7-day operation in biological treatment. Some waste must be found that can be stored and used to maintain the process during the time the mill is not in operation. In several cases, industry has contracted to treat domestic sewage for municipalities in order to provide a more economical solution for both.

Conclusion

In conclusion, I would like to offer these four points that I think are necessary for the successful solution to an industrial waste problem:

1. A genuine desire by the management to solve the problem.
2. A thorough study of the problem by competent personnel.
3. Good design based on the results of the study.
4. Efficient operation of the treatment plant.

The problem of stream pollution is increasing every day. New and more economical methods of waste treatment are needed to combat this ever-increasing problem. Industry should continue to strive for better methods of treatment.

Maintenance & Engineering Conference — Chicago

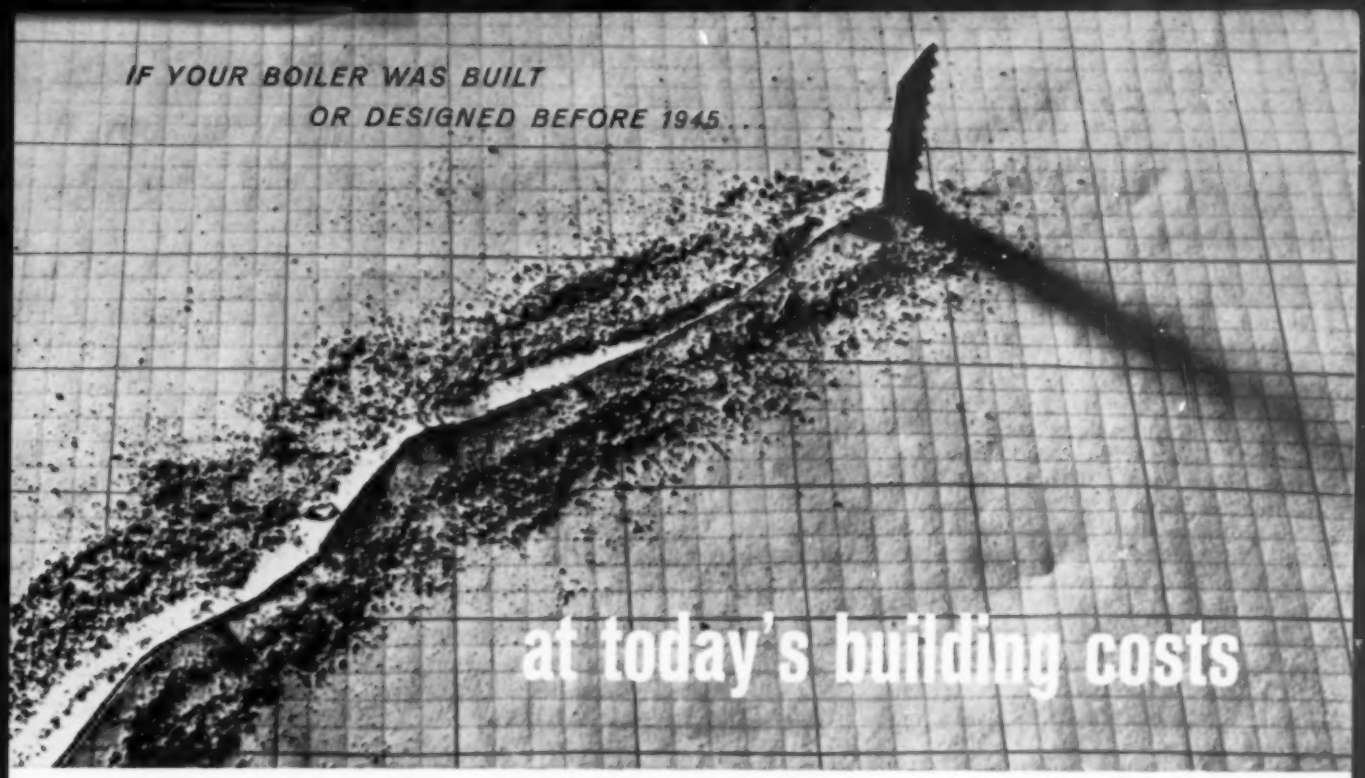
Speakers from a broad cross-section of industry will address the **1961 Plant Maintenance & Engineering Conference** to be held during the first three days of the **Plant Maintenance & Engineering Show.**

The show is scheduled to run from January 23 through January 26 at the International Amphitheatre in Chicago. Morning sessions of the conference will take place at the Amphitheatre and evening sessions at the Palmer House.

Conference topics this year are balanced to include both the managerial and technical aspects of maintenance. Special "problem sessions" have been arranged for automotive, chemical, electronic equipment, textile, cement, metalworking and metal-fabricating, paper, petroleum processing, food processing, research and development and steel plants.

Management leaders from these industries are among the speakers along with others from such fields as telephone and telegraph, soap, aviation, business machines, tobacco, materials handling, pharmaceutical, rubber, instruments, rocketry, atomic energy, plastics, appliances and government.

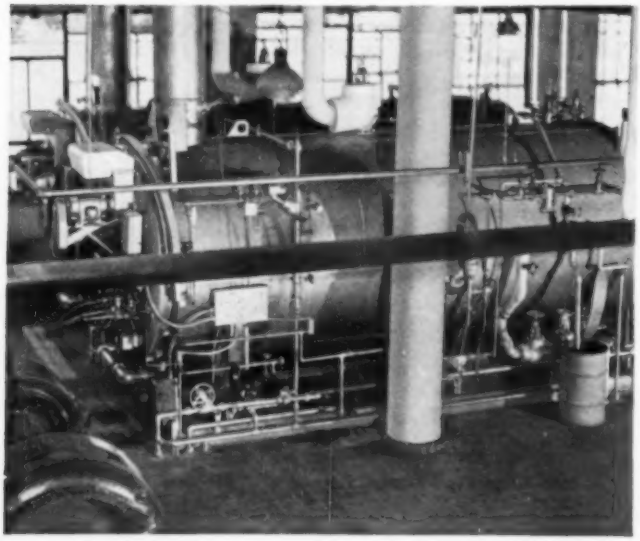
The show will be one of the largest ever held with an exhibit area of more than six acres.



you may be paying for it a second time!

BOILER ROOM CONVERTED TO WORK AREA

Robert A. Johnston Company, cookie, candy and chocolate products manufacturer in Milwaukee, Wisconsin, replaced four coal-fired boilers with two fully automatic, gas-fired CB boilers. Mr. James Vida, plant engineer, reports: "Compact Cleaver-Brooks design made it possible for us to install the boilers in another part of the plant — in an area of only 750 sq. ft. — releasing the old boiler room, 9000 sq. ft., for storage and work areas. It saved us the cost of an expansion project."



Today, with building costs twice what they were in 1945, your big, old boiler — possibly coal-fired — can cost you money by occupying space that might be used for other needs.

To offset these climbing construction costs and meet the compact requirements of modern architecture, one manufacturer, Cleaver-Brooks, has proved that big boiler performance and capacity can be engineered into a compact boiler package. Today's CB packaged boilers — in addition to solving unusual installation problems, such as low headroom — are releasing sizeable ground-level areas for production or storage purposes. In some cases, "penthouse" installations have utilized space on an upper floor and *completely eliminated* the use of ground-level space.

Here are some of the design features that combine for maximum space-saving: four-pass design, forced-draft combustion, updraft construction and all the advantages of five square feet of heat-transfer surface per boiler horsepower. These standards of quality and compactness are only available from Cleaver-Brooks, manufacturers of the most compact, fuel-saving packaged unit on the market.

Cleaver-Brooks boilers are completely pre-engineered and tested as a package . . . expertly started for you by a trained field engineer. Sizes through 600 hp . . . oil, gas and combination oil-gas firing . . . larger sizes in Cleaver-Brooks Springfield water-tube boilers.

Ask your local Cleaver-Brooks agent for more details or write for the booklet, *How to Select a Boiler.*

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Technology and the Atom .....

By JOHN F. LEE
SPI Consultant on Atomics
Broughton Professor and
Head of Mechanical Engineering Dept.
North Carolina State College

THE ATOM, space technology and electronic systems are modern marvels which are products of the scientific revolution. This revolution is a long way from reaching its peak and we can look forward to an intensified influence of science on industry and the range of products produced by industry.

A sharp eye on developments in the research laboratories today can give management an advance warning of what needs to be done now to implement decisions to be made tomorrow when these developments emerge from the research cocoon. To wait until the products of the scientific revolution break into the markets could spell trouble for those industries that lack the clairvoyance to look ahead.

The scientific revolution and its impact on technology can mean a great deal to the Industrial South. Failure to understand the consequences of this revolution, however, could very well reverse the magnificent growth of industry in the South. Keeping abreast of scientific trends can provide the knowledge upon which to base creative decisions for future action.

If the basis for future action is established now by foreseeing possibilities of new developments the industrial growth of the South can pale anything we have observed thus far. For example, current developments in data processing and scientific instrumentation could make management decisions taken today, in ignorance of these developments, a burden.

A plant designed with future developments in these fields taken into account could result in a swift and inexpensive adjustment to automation at a later date. Since much new industry is being established in the South it is imperative that this type of enlightened management decision be made if obsolescence is not to occur too rapidly.

State Atomic Authorities

Oak Ridge National Laboratory will conduct a six-weeks course in health physics for representatives of state and local governments beginning April 4, 1961. The program is sponsored by the U. S. Atomic Energy Commission. The instruction will provide training for radioactive materials licensing and inspection functions.

The program serves as another step in encouraging states to assume control of limited radioactive materials under an amendment to the Atomic Energy Act passed last September. Similar training will be available during a coming 10-weeks course at AEC's Health and Safety Laboratory in New York. Argonne National Laboratory expects to offer a course early next year.

Prior to the ORNL instruction, Oak Ridge Institute of Nuclear Studies will offer a four-weeks course in radioisotope techniques beginning January 6 and March 6. Since there is no charge for such instruction, persons attending are responsible only for their living expenses. Applicants should hold a bachelor's degree in science on engineering, or its equivalent. The State-AEC Relations Branch, Office of Health Safety, AEC Washington, is coordinating the program.

Further information is also available from ORNL, Argonne, ORINS, and AEC's Health and Safety Laboratory.

Rechargeable Fuel Cell

A lightweight fuel cell, which can be used to generate electric power in satellites and space vehicles and can be recharged by solar radiation, has been developed by Ionics, Inc., and was announced at a meeting of the American Rocket Society.

Operating on hydrogen gas and a solution of common chemicals, bromine and water, the cell has demonstrated unusual electric generating capabilities which make it suitable for powering instruments, life support equipment, communications facilities, lighting and other apparatus required for manned satellites and vehicles traveling in space.

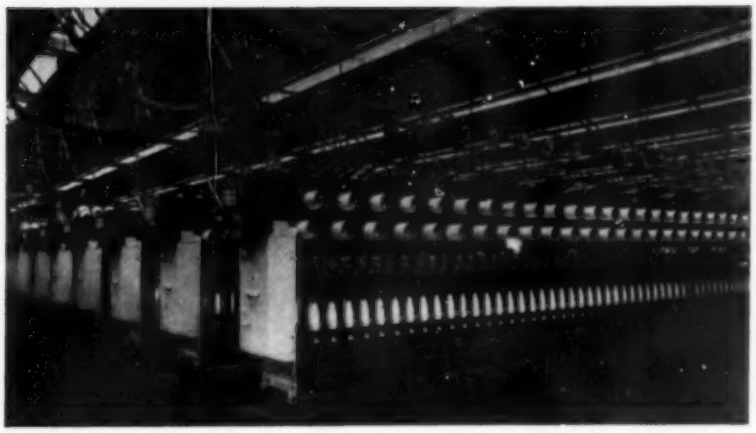
It can be recharged using solar cells which convert energy from sunlight into electricity while a satellite is on the sunny side of the earth, and then supply necessary electric power while the satellite is in the shadow of the earth where solar cells cease to function.

This cell is particularly attractive for space applications, because of the high power density obtainable when it discharges and because of the low voltage required from the solar cells used for recharging. Fuel consumed while the cell is supplying power is regenerated during the charging cycle and available for reuse. The special plastic ion exchange membranes developed by Ionics are a key part of the cell design which make possible the cell's superior performance.

Ultra-Pure Water

A major breakthrough in the search for better means of producing the ultra-pure water needed by certain modern industries has been announced by Bogue Electric Manufacturing Company. This company has developed a system that achieves the presently recognized theoretical ultimate in water purity on a production scale without the use of heat. This marks the first time that water containing less than one part of solids per billion parts of water has been mass-produced without employing

(*Continued on page* 62)



Owens-Corning Plant In Operation — S. C.

A new multi-million dollar textile yarns manufacturing plant, which when completed will be the largest and most modern synthetic fiber plant in the nation, has been put into initial operations in Aiken, South Carolina, by **Owens-Corning Fiberglas Corporation.**

Located on a 350-acre site, the air conditioned plant is equipped with numerous automatic processing controls and will have a production capacity of 70 million lb of high quality glass-fibers per year.

Close cooperation between Fiberglas engineers, officials of Bechtel Associates, designers and project managers; the Daniel Construction Company, of Greenville, South Carolina, general contractors, and the City of Aiken permitted start up of operations of the huge plant in a record seven months.

The 900,000 sq ft plant contains complete glass fiber forming, fabrication and warehousing facilities capable of mixing the basic ingredients of glass and transforming them into finished textile yarn products. Special equipment automatically feeds, weighs and blends the raw materials of glass and conveys them to furnaces under rigidly controlled conditions.

Processing equipment includes newly designed gas-fired furnaces to melt and refine the glass, new fiber forming and winding equipment, new twist and ply machinery, electronic equipment, and the world's largest overhead electrical monorail system.

Among the Fiberglas products used in the plant's construction are ducts, polarizing light panels, Kaylo and Fiberglas pipe insulations, acoustical ceilings, tiles and boards, wall panel and roof insulations, Perma-ply built-up roofing, shingles, reinforced plastic paneling, filters, curtains and draperies.

FUTURE EVENTS of Engineering Interest

Jan. 20: Gulf Coast Regional Meeting. Natural Gasoline Assn. of America, The Robert Driscoll Hotel, Corpus Christi, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

Jan. 23-26: Plant Maintenance & Engineering Show, International Amphitheatre & Palmer House, Chicago, Ill. Clapp & Poliak, Inc., 341 Madison Ave., N. Y. 17, N. Y.

Feb. 13-16: 15th International Heating & Air Conditioning Exposition, International Amphitheatre, Chicago, Ill. American Society of Heating, Refrigerating & Air Conditioning Engineers, National Meeting. International Exposition Co., 480 Lexington Ave., New York 17. E. K. Stevens, Mgr.

Feb. 24: South Louisiana Regional Meeting, Natural Gasoline Assn. of America, Lafayette Petroleum Club, Lafayette, La. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

March 5-7: Southern Safety Conference & Exposition, Atlanta Biltmore Hotel, Atlanta, Ga. W. L. Groth, Exec. Dir., Box 8927, Richmond 25, Va.

March 15-17: 40th Annual Convention, Natural Gasoline Assn. of America, The Baker Hotel, Dallas, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

April 5-7: AIEE Southeast District meeting, Jung Hotel, New Orleans, La. Sec'y American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.

April 12-13: AIEE Materials Handling Conference, Hotel Sheraton, Philadelphia, Pa. H. A. Zollinger, Chm. AIEE Materials Handling Subcommittee, Westinghouse Electric Corp., Pittsburgh, Pa.

April 19-21: 7th Southeastern Regional Conference & Instrument Exhibit, Instrument Society of America, Park Center & Public Library, Charlotte, N. C. Eugene B. Finch, Exhibit Chairman, Rt. 2 — Box 673C, Charlotte 9.

April 28: Oklahoma Regional Meeting, Natural Gasoline Assn. of America, Lake Murray Lodge, Ardmore, Okla. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

May 19, 1961: Permian Basin Regional Meeting, Natural Gasoline Assn. of America, The Lincoln Hotel, Odessa, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

Utilities Leasing Corp. — Florida

Announcement has been made of a newly formed firm, **Utilities Leasing Corporation,** with headquarters at 2220 S.W. 23rd Ave., Miami, Florida. Caryl H. Stern is president.

Function of the company is to provide water supply, water treatment, and sewage disposal units that meet standards recently set by the State Board of Health for new construction. Leases, lease-purchase agreements, and outright sales of the equipment can be arranged.

Fulbright Laboratories Charlotte, N. C.

A dream envisioned twenty years ago became a reality when **Fulbright Laboratories** recently moved into its modern, new location at 1201 South Graham Street, Charlotte, North Carolina.

C. O. Fulbright

C. B. George

In December, 1940, Fulbright Laboratories was formed as a sales and service organization for Water Treatment and Corrosion Engineering. Its founder had nearly 25 years experience in the Chemical Engineering field. These years had carried C. O. Fulbright throughout all the U.S.A., the Orient, Europe and Latin America. Returning to the U.S.A., he recognized the necessity for a firm located in the heart of the South to better serve the established concerns and new industries of this area.

In 1942 Fulbright moved its office and laboratory to 213 East Tremont Avenue, and braced itself for the fierce war years. Industries engaged in the war effort entrusted Fulbright Laboratories with their boilers, power plants, air conditioning and process waters. The problems encountered during these years were faced, and with their solution came maturity and recognition.

With the ending of hostilities in 1945, the industrial growth of the South moved ahead at a tremendous pace. Fulbright Laboratories expanded its operations throughout the Middle Atlantic and Southeastern States west to the Mississippi River. Such Fulbright trade names as Ful-O-Fos and Ful-O-Cide came in to common usage in industrial plants.

Starting with only three employees, Fulbright Laboratories has grown to include field locations strategically situated throughout the territory, as well as a complete staff of chemists, technicians, and registered professional engineers for water treatment and corrosion engineering.

The year 1960 saw Fulbright Laboratories still on the upward trend. With continued growth, the Tremont Avenue location became too small for the flow of business, and the company purchased larger facilities at 1201 South Graham Street. The new headquarters has been completely renovated and remodeled. It now provides approximately 12,000 sq ft of additional space for the company's activities; and the folks at Fulbright point with pride to the adjacent footage which is ample for future expansion. Mr. C. O. Fulbright continues as president of the company and Mr. Charles B. George is Technical Director.

Westinghouse Honors Power Sales Engineers

B. J. George, Sr., a sales consultant with the **Kansas City Power & Light Company,** has been chosen as the first gold award winer of the national "Power-Up Achievement Award" established by the Westinghouse Electric Corporation.

Mr. George was chosen from nearly 100 participants throughout the country. The purpose of the award is to select and honor outstanding power sales engineers based on the thoroughness of their effort and the results achieved in servicing a particular customer's needs.

The awards will be made on an annual basis by Westinghouse.

Mr. George, who joined the Kansas City utility in 1917, submitted a case history of his work involving the power requirements of a large department store. He will receive a gold medal inscribed with his name and the name of his utility, plus $250.

Among six other finalists, who will receive bronze awards plus $100 each, is **William F. Doherty** of **Union Electric Company,** St. Louis, Mo.

DECO Engineering Advisor

Announcement has been made of the appointment of Charles L. Spencer as Special Engineering Advisor for Systems Evaluation of the **Developmental Engineering Corporation.** DECO, with offices in Washington, D. C., and laboratories at Leesburg, Virginia, and Boulder, Colorado, is a leading firm in superpower communications systems, and antenna design and development.

Since 1954, Mr. Spencer has been a consultant to the U. S. Navy's Bureau of Ships, where he has coordinated and advised the Bureau of Ships and contractors on terminal equipment, transmitters and antenna problems.

Mr. Spencer was graduated from the University of Arkansas with a B.S. degree. His home is at 800 Rollins Drive, Alexandria, Virginia.

(*Continued on page* 50)

YARWAY Y news briefs

from **Yarnall-Waring Company,** *Philadelphia 18, Pa.*

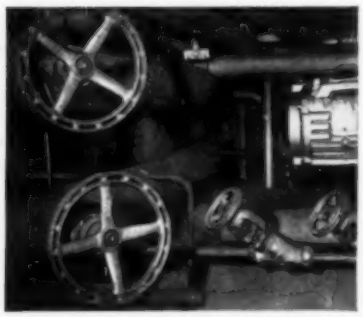
ATLANTA OFFICE: 453 IVEY BUILDING, 3330 PEACHTREE ROAD, ATLANTA 3, GEORGIA

WHY YARWAY WELBONDS ARE SPECIFIED FOR HIGH PRESSURE VALVE JOBS

Yarway Welbond Valves (sizes ¼" through 2½") have won resounding acceptance from boiler room operators everywhere because of these 6 unique features—resulting in *outstanding performance* that is *dependable* and *trouble-free:*

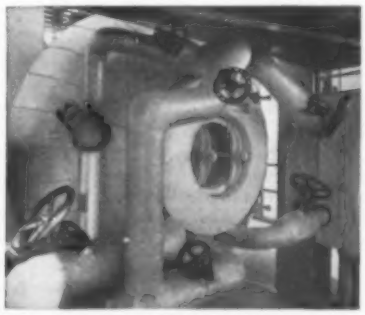
1. Full accessibility—all working parts readily removed through top of yoke. Jack action of stem forces out old packing.
2. Guided valve stem of #321 stainless steel—will not "pit." Self-aligning, stellite-faced disc.
3. High temperature inhibited stem packing furnishes double insurance against packing leaks.
4. Unique seat design with thermal compensating groove that prevents distortion during assembly welding and when welding valve into line. Also permits perfect seating of disc for tight seal. Integral seat is stellite-faced.
5. One-piece forged chrome-moly steel body and yoke.
6. Easy-grip, ventilated handwheel—makes operating a "breeze".

More details—and list of users? Write Yarway. Ask for Bulletin B-454.



Four of many Yarway Welbonds installed in large eastern public utility plant. Steam pressure 1850 psi; temperature 1000°F.

Four Yarway Welbonds on main steam line to turbine at southern power plant. Press. 2310 psi; temp. 1000°F. Over 100 Welbonds here.



Six of 900 Yarway Welbonds at southwest utility. Boiler drum pressure in this plant—2150 psi; superheat temperature 1005°F.

AUTOMATIC
DE-I*
ILLCO-WAY
DESIGNERS AND BUILDERS
MODERN EQUIPMENT FOR ionXchange

*DE-IONIZER

Here is a typical *fully-automatic* De-Ionizer, skid-mounted, loaded with resins, tested, ready for hook-up in your plant. A complete Control Panel (not shown), built by IWT, is included. Valves are exclusive ILLCO-MATIC, high-density polyethylene, specially designed for ionXchange service, pneumatically-operated, and *proved* reliable in extensive use.

FOR ANY PROCESS REQUIREMENT, OR HIGH-PRESSURE BOILER MAKE-UP

Such De-Ionizers are used to provide extremely pure water, tailored to specifications for all kinds of processes, or to the particular conditions for make-up of modern high-pressure boilers.

TELL US YOUR NEEDS

Our pioneering experience, gained since the very beginning of ion-exchange, is available for the successful solution of your water-treatment problems. Call your IWT representative.

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

Southern News Briefs (Continued)

Corning Glass Works Building Va. Plant

Corning Glass Works announced plans for construction of a new plant to start about the first of January on an 89-acre site at Danville, Virginia. Manufacturing operations are expected to begin early in 1962.

The plant will have 190,000 sq ft of floor space and initially will employ about 200 persons. It will be operated by the company's Technical Products Division. William C. Decker, president, said the plant is being built to meet the growing demand for many high quality specialty glasses.

These include a 96 per cent silica glass used for Vycor Brand laboratory apparatus and industrial equipment, a number of glasses in tubing and sheet for technical applications, and several glasses used in the electronics industry.

All of these glasses are produced by similar processes. Mr. Decker said consolidating their manufacture into one plant would enable Corning to meet more efficiently the demands for these materials.

G. E. — Charlotte

The **General Electric** District Sales Operation with headquarters in Charlotte, N. C., and headed by J. F. McElwee, has won a unique award in a sales-quota contest. They won the "Sell the Seal in '60" campaign of G-E's Medium Transformer Department with a selling record of 218% of quota. MTD adopted a "gold seal" as a selling theme to symbolize Certified Full Value medium transformers to the customer.

The secret award for the best job of selling the seal is a real live seal. Not just any kind of a seal, but the barking, ball balancing, fish eating kind. South Atlantic salesmen operating out of Charlotte are now the proud owners of a seal, who with proper training will join the ranks of people-watchers in a regional zoo.

Presentation of the seal was made to J. F. McElwee by D. B. Lawton, general manager of MTD, at a special awards banquet held in Charlotte.

Milton Lite Opens Engineering Office

Milton Lite, registered professional engineer, has opened his own office for the practice of consulting mechanical engineering. He will specialize in industrial steam and power applications. The address is 426 North Pleasantburg Drive, Greenville, South Carolina.

Mr. Lite was formerly assistant department head of J. E. Sirrine Company, Inc. He has had seventeen years experience in the steam and power field — with the past eight years devoted to initial studies, economic studies, basic layouts, and detail designs for industrial plants.

Mr. Lite holds a Bachelor of Mechanical Engineering degree from the College of the City of New York, and a Master of Science degree from Stevens Institute of Technology. He is a member of Pi Tau Sigma, and a past president of the Piedmont Chapter of the South Carolina Society of Professional Engineers.

Permatex — S.E.

Permatex Company, Inc., producer of industrial sealants and maintenance chemicals, announces the appointment of Michael L. Sullivan as manager for the newly-created Southeast Industrial Region.

The region includes all of Florida, Georgia, South Carolina, North Carolina, Alabama, and part of Tennessee (including Chattanooga, Knoxville and Nashville). Mr. Sullivan's address is 9520 Thanksgiving Drive, Miami, Florida.

Lincoln Electric — S.E.

The Lincoln Electric Company, Cleveland, Ohio, announces the transfer of Ronald C. Pierce from Savannah, Georgia, to the Mobile, Alabama office.

James T. Hart and Richard K. Lore, after completing a one year training course at the factory, have been appointed Field Engineers and assigned to the Memphis, Tennessee, and Atlanta, Georgia offices.

Allis-Chalmers — Tex.

Cottingham Bearings & Service, Inc., 401 Exposition St., Dallas, has been named a distributor for **Allis-Chalmers** motors in Dallas and Tarrant counties in Texas.

R. L. Cottingham is president of the new distributorship. Other principals are Harry Lord, secretary, and W. H. Wood, sales manager.

Sutorbilt — Md. & Va.

Jobe and Company, 2857 Greenmount Ave., Baltimore, Md., has been appointed representative of **Sutorbilt Corporation** for sales engineering and customer service in Maryland and Virginia.

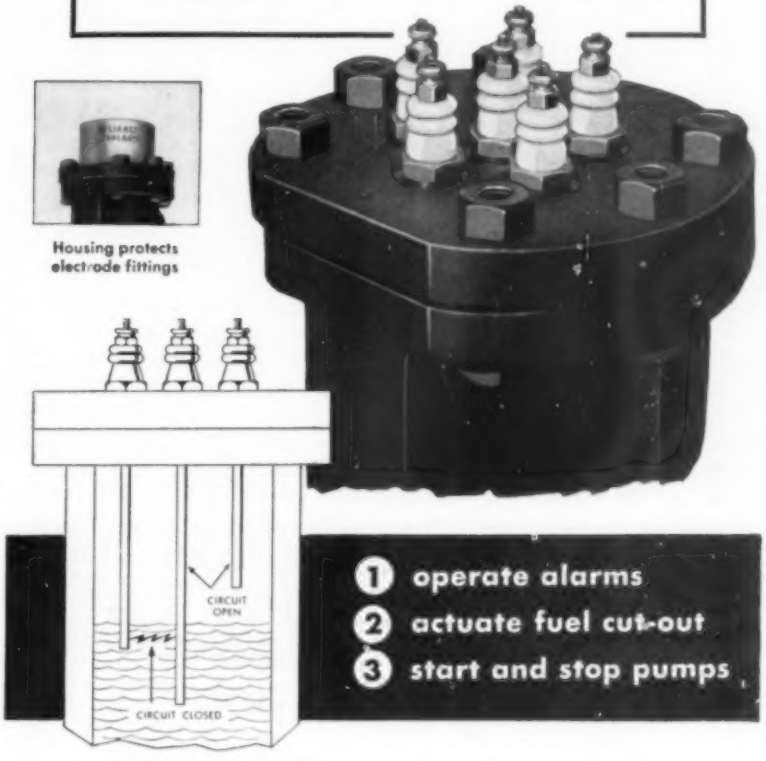
The Jobe firm maintains a branch in Richmond, Va.

What could be simpler?

Your boiler water is a conductor;

Its rise and fall can be made to make and break circuits;

Simple efficient control to 1, 2, 3 (below)



RELIANCE ELECTRODE LEVALARMS GIVE YOU *INSTANT ACTION* – at exact pre-set water levels. Minute transformer-isolated currents pass through boiler water in the column – actuate controls through relays. From one function (fuel cut-out or low water alarm) to combinations of up to *five or more* are possible with a Levalarm: low or/and high water level alarm, fuel cut-out, start and stop pumps, etc.

Electrode Levalarms are entirely electrical; they do not depend on vacuum tubes or magnets – have no stuffing boxes or bellows. Models available for every pressure or temperature.

It will pay you to get full information on Reliance Levalarms. Write the factory or contact nearest Reliance Representative.

The Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, Ohio

Reliance BOILER SAFETY DEVICES

Southern News Briefs (Continued)

Rockwell — Kansas City

William W. Shade has been named district manager in the Kansas City, Mo., area for **Rockwell Manufacturing Company's** Meter & Valve Division.

Mr. Shade joined Rockwell in 1950 as a market analyst and has been a sales engineer in the district since 1955. He is a graduate of Penn State and a member of the American Marketing Association.

Zurn Industries — Texas

Zurn Industries, Inc., designers and producers of pipe line strainers and fluid handling devices, have announced the appointment of Harris Pruitt & Co. as sales engineers for the Fluid Control Division.

Located at 4025 West Rosedale, Fort Worth, Texas, the newly-associated office is staffed by Harris Pruitt and his son, James H. Pruitt. Both have had extensive experience with large Southwest processing and construction firms.

Keystone — Arkansas

Keystone Manufacturing Co., producer of wiring installation equipment, announces the appointment of Malcolm Kueneman as sales representative for Arkansas, Northern Missisippi, Western Tennessee and Dunklin and Pemiscot counties in Missouri.

Mr. Kueneman's sales office is at 1113 Spears Street, West Memphis, Arkansas.

Trinity Steel — Okla.

Trinity Steel Company, Inc., Dallas, Texas, has announced the appointment of Rex Bircket as custom sales representative in the Tulsa, Okla., area.

Following his graduation from Oklahoma University in 1929, Mr. Bircket served in an engineering capacity with two of the major oil companies. He was sales engineer for a large equipment supply house before he became an independent manufacturers' representative.

Diamond Chain — S.W.

Diamond Chain Co., Inc., Indianapolis based subsidiary of American Steel Foundries, recently opened a factory warehouse and sales office in Dallas, Texas.

Dallas was chosen because the location enables the company to make faster deliveries of its roller chains and sprockets to oil fields and industrial customers in the South and Southwest. The 7,500 square foot warehouse provides one day delivery into the five-state area of Texas, Louisiana, Oklahoma, Mississippi and Arkansas.

Riley Stoker Acquires Union Iron Works

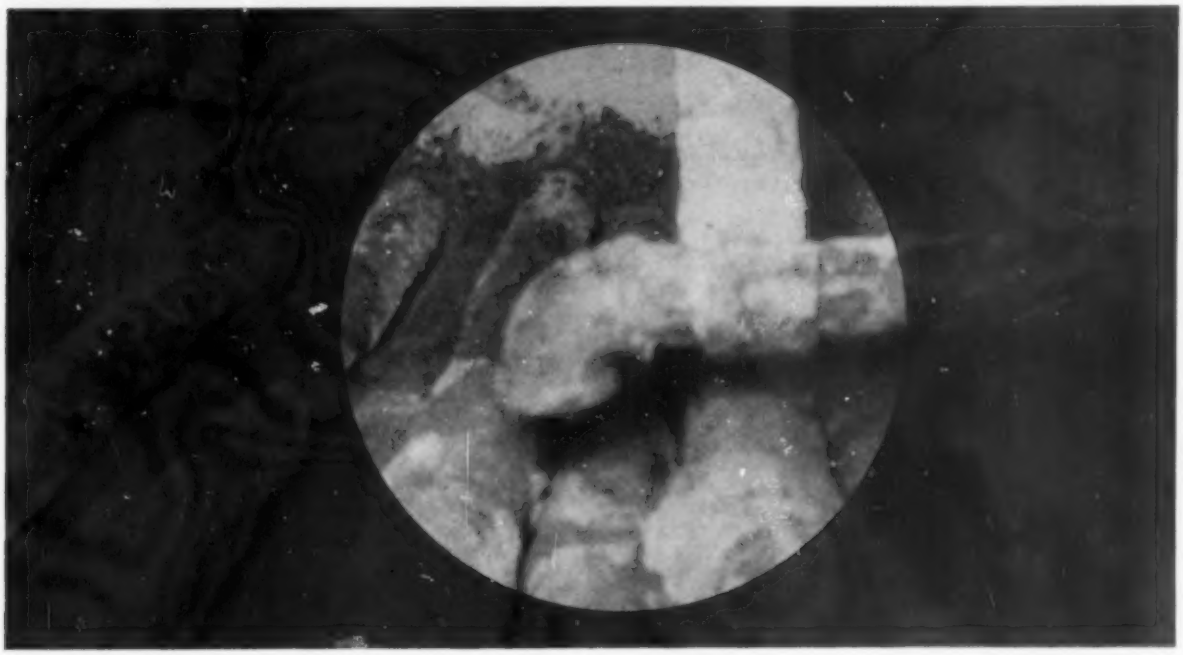
Riley Stoker Corporation announces that it has acquired all of the capital stock of **Union Iron Works** of Erie, Pennsylvania.

Union Iron Works continues operations under its same management, as a subsidiary of Riley Stoker Corporation.

Riley Stoker Corporation has for many years been a major producer of high pressure power steam generating and fuel burning equipment for public utility and industrial installations. In addition A. W. Cash Co., a Riley subsidiary, produces pressure and temperature valves and

BRAXON

stops scale and corrosion



Braxon conditions water, protects boilers

BRAXON is a specially formulated feedwater treatment that conditions water to remove and prevent scale formation and corrosion in boilers. BRAXON bases its effectiveness on phosphate and carbonate control . . . maintaining the proper alkalinity and softness in the boiler water. Special BRAXON formulas inhibit the tendency of some feedwaters to produce foaming and carryover. No single formula can be applied successfully to all the various types of boiler feedwater, so BRAXON formulas are prepared specifically for use in *your* plant after a careful analysis and study of raw water used. Your BRAXON formula will keep your boiler operating at top efficiency, eliminating shut-downs and repairs caused by corrosion and scale. . . BRAXON can save your company money.

Write today and request that an Anderson service engineer make an analysis and recommendations for your plant's water treatment. There's no cost for this service.

SPECIALISTS IN MAKING WATER BEHAVE

Anderson Chemical Company, INC.

Macon, Ga., Box 1424 • Phone Sherwood 5-0466

Memphis, Tenn.: Box 2432, DeSoto Station • Phone: BRoadway 2-2806

Southern News Briefs

(*Continued from page* 52)

combustion control apparatus.

Union Iron Works produces package boilers, low pressure boilers, waste heat boilers, vaporizers, high temperature hot water heaters, thermal liquid heaters, process equipment and autoclaves. Such products complement the Riley product line and are sold in the same general market.

Conoflo — Ga., Tenn.

The Procester Company, headed by Earl Ruth at 2859 Ridgemore Road, N.W., Atlanta, Ga., has been appointed exclusive representative for **Conoflow Corporation** in Georgia and eastern Tennessee.

Mr. Ruth, an engineering graduate from Missouri School of Mines, has had extensive experience in the chemical and petroleum process fields, and has held sales positions with M. W. Kellogg and Black, Sivalls & Bryson. He is a registered professional engineer and a member of the ASME and ISA.

Allis-Chalmers — Carolinas

Appointment of a new distributor and a new agency in the Carolinas has been announced by **Allis-Chalmers Industries Group.**

The Carolina Machinery & Supply Co., Inc., 201 S. Washington St., Rocky Mount, has been named a distributor for Allis-Chalmers motors and generators, control, rotary compressors, and vacuum and centrifugal pumps in 46 counties in North Carolina. George H. Booth is president and Alex E. Booth, vice-president.

Shealy Electrical Wholesalers, Inc., 27 River St., Greenville, has been appointed an agency for Allis-Chalmers regulators, power transformers, switchgear, circuit breakers, and capacitors in northeastern South Carolina and in southwestern North Carolina. John H. Shealy is president and treasurer, and Henry P. Bryant sales manager.

George E. Clark, Jr.; James R. Stevens; Melvin M. Tappen.

Lunkenheimer Appoints Southern Representatives

Three appointments in sales personnel have been announced by the **Lunkenheimer Co.**, Cincinnati manufacturer of valves.

George E. Clark, Jr., of Charleston, West Virginia, will cover West Virginia, part of Ohio, and eastern Kentucky.

James R. Stevens, with headquarters at Houston, has a territory including the Houston area and central and south Texas.

Melvin M. Tappen, who lives in Dallas, is representative covering the Dallas-Fort Worth area and west Texas including El Paso, Midland, and Odessa.

A. T. Massey — Va.

J. Douglas Enochs has joined the sales staff of **A. T. Massey Coal Company, Inc.**, Richmond, Virginia. Mr. Enochs began his sales career with Smokeless Fuel Company in 1936. He was most recently District Manager for Jewell Ridge Coal Sales Company in Richmond.

Mr. Enochs is a native of Bluefield, West Virginia, where he attended Bluefield College, and later transferred to Davidson College in North Carolina where he completed his education.

Tube Turns Names Regional Managers

Establishment of a nine-region field organization to strengthen marketing capabilities has been announced by **Tube Turns Division of Chemetron Corporation.**

Headquarters cities and newly promoted regional managers include Southeastern, Atlanta — James F. Craig, Jr.; Central, Louisville—E. R. Muir, Jr.; Midwestern, Kansas City — L. D. Hall; Mid-Continent, Tulsa —L. O. Morris, Jr.; Southwestern, Houston — W. B. Whenthoff.

L. A. Watts Dies — Tenn.

Leon A. Watts, retired manager of **Allis-Chalmers** service and erection department, died in November at Johnson City, Tenn. He had recently celebrated his 81st birthday.

Mr. Watts joined Allis-Chalmers in 1902 and served as head of the service and erection department for 13 years. He retired from the company in 1955.

A-C Southern Distributors

Three new Southern distributors have been named by **Allis-Chalmers Industries Group.**

The Blue Ridge Hardware & Supply Co., Inc., Bassett, Va., has been appointed distributor for motors and controls and an agency for Allis-Chalmers unit substations in several surrounding counties in Virginia. W. W. Sale is president, and C. R. Dent, sales manager.

Machinery Service Co. of Tampa, Inc. has been named a distributor for Allis-Chalmers motors, controls, and pumps in the firm's Tampa, Florida, office territory, handling sales to municipalities, contractors and subdivisions exclusively. R. F. Campo is president of the Tampa company.

The Sutton Electric Co., Mount Olive, North Carolina, has been appointed a distributor for Allis-Chalmers controls in Wayne, Duplin, Sampson and Johnston counties in North Carolina. The concern is headed by R. E. Sutton.

Tube Turns — S.E.

Promotion of James F. Craig, Jr. to manager of its new Southeastern region was announced by **Tube Turns Division of Chemetron Corporation,** Louisville, Ky. Regional headquarters are located in Atlanta with district offices in Tampa and Birmingham.

Mr. Craig, a native of Louisville, joined Tube Turns in 1941 and has been Atlanta district manager since 1956.

KEEP UP-TO-DATE
USE SPI
READER SERVICE

See pages 65 & 66

Insulation Manual

The Associated Asbestos Contractors of the Southeastern States has published a highly serviceable Insulation Manual and Specifications, primarily for use of its members.

The Association is composed of companies that specialize in furnishing and installing insulation for piping and equipment. It is interested in encouraging use of insulation material, and the education of users as to the kinds of materials and methods which will achieve economy of operation.

The second edition of the manual, published January, 1960, contains sixty 8½ x 11" sheets in a heavy loose-leaf binder. There are sections on: Liquids, Steam, Equipment & Boilers, Measurements, Air Conditioning, Finishes, and General Data.

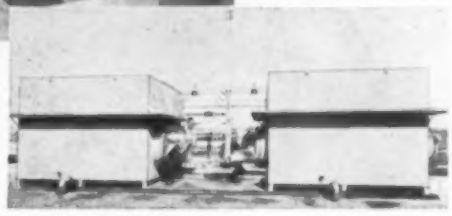
Price of the manual is $5.00. It may be purchased from: Assoc. Asbestos Contractors of S.E. States, Box 10002, Charlotte, N. C.

Borden's New "Dairyland Showcase" plant relies on an all-Vilter Refrigeration System

With 110,000 square feet of floor space, Borden's new $3,000,000 Milwaukee milk and ice cream plant is one of the most up-to-date and modern dairies ever built.

Borden's

Overall view of compressor room showing the six Vilter ammonia high-stage VMC compressors, Vilter brine cooler and liquid receiver. Five rotary booster compressors are installed in a line behind the intercooler.



View of the two Vilter VP350 evaporative condensers which handle the discharge from the compressors. A center partition in each unit provides an efficient means of reducing capacity and maintaining desired head pressure during cold weather.

500,000 quarts of milk a day! 5,000,000 gallons of ice cream a year!

These are the very imposing capacities of Borden's new Milwaukee milk and ice cream plant—the largest in Wisconsin.

An extensive all-Vilter system provides the refrigeration for the varied requirements of this plant. *Four* separate methods of refrigeration are employed—direct expansion, liquid recirculation, flooded and brine.

Borden's compressor room contains six Vilter ammonia VMC compressors and five boosters. A 42" x 10' Vilter intercooler is installed between the two stages. Handling the discharge are two Vilter VP350 evaporative condensers.

Each day the largest sweetwater tank installed in the state of Wisconsin chills 670,000 gallons of water to 33° which, in turn, holds the pasteurized milk storage tanks at 38°. Fifteen air units provide the refrigeration for the milk cooler, and forty-four truck charging positions accommodate the milk delivery fleet.

Other major Vilter equipment includes a hot gas defrost blast freezer for Borden's mammoth ice cream hardening room and a brine cooler for ice cream bar freezing.

All equipment selected by Borden was chosen to perform its job efficiently, quickly and insure the most sanitary, pure and wholesome products. Vilter is proud to play a part in this, Borden's "Dairyland Showcase."

Why not check with Vilter on your refrigeration problems?

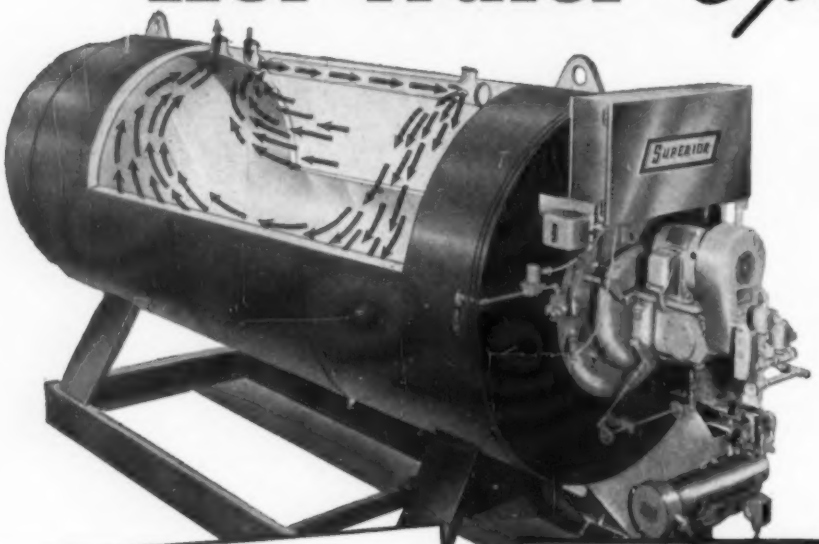
Vilter® refrigeration air conditioning

The Vilter Manufacturing Company
Milwaukee 7, Wisconsin

Air Units • Ammonia and Freon Compressors • Booster Compressors Baudelot Coolers • Water and Brine Coolers • Blast Freezers Evaporative and Shell and Tube Condensers • Pipe Coils Valves and Fittings • Pakice and Polarflake Ice machines.

Write for your copy of bulletins covering above equipment to The Vilter Manufacturing Company, Dept. SP-603 2217 South First Street Milwaukee 7, Wisconsin.

Designed specifically for **Hot Water** *Operation*



with...

Venturi-Action Mixing-Tube

Venturi-Action Mixing Tube
plays a triple role:

1 It starts by mixing entrained water from the boiler with water entering the boiler.

2 Traveling through the tube, temperature is further modified by the surrounding water.

3 Jet action at the end of the tube directs flow downward and outward against the outer confines of the shell, providing a circulation pattern unequalled in any other hot water boiler.

SUPERIOR "TYPE CC"

This new Superior Hot Water Boiler eliminates the problems resulting from the use of steam boilers for hot-water heating. Most of these stem from improper circulation withia the boiler.

Its newly designed Venturi-Action Mixing-Tube achieves a more effective use of the natural flow pattern for maximum efficiency in hot water heating.

In addition to its special hot-water design, features include 4-pass down-draft design, 5 sq. ft. of heating surface per bhp., built-in induced draft, fully automatic operation firing gas, oil or both, and a host of other features described in detail in the new catalog illustrated at left.

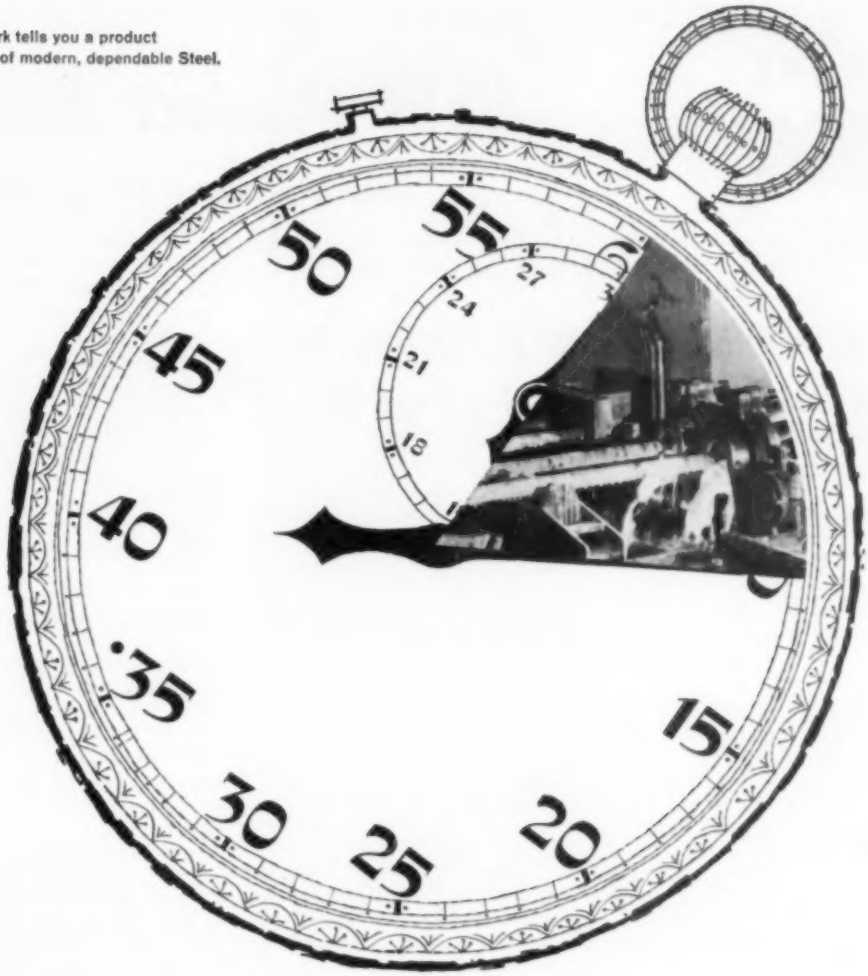
For sizes to 11,720,000 Btu's/hr., write for catalog CCW-15.
For sizes to 20,100,000 Btu's/hr., write for catalog CFW-15.

Fire-Tube and Water-Tube PACKAGED BOILERS
for STEAM or HOT WATER

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N. Y.

SUPERIOR PACKAGED BOILERS ®

This mark tells you a product is made of modern, dependable Steel.



The ten most important seconds in the life of a pressure tube

Every length of USS National Electric-Resistance Welded Pressure Tube must pass a hydrostatic pressure test before it leaves our mill.

Each tube is fitted in leakproof heads and filled with water treated with a corrosion inhibitor. After all air is purged, pressure is applied and held for ten seconds. Internal hydrostatic pressure varies with size as prescribed by applicable ASTM specifications which are designed to produce a wall stress from 16,000 to 24,000 psi. Typical pressures so calculated are 4,000 psi for 1″ O.D. x .085″ wall and 2,100 psi for 3″ O.D. x .134″ wall.

Our rigid inspection of each pressure tube promises long efficient service in boilers, heat exchangers, condensers, super-heaters, economizers and other pressure applications.

For your next installation, consider USS National Electric-Welded Pressure Tubes. They are stocked all over the country by National Tube Distributors. Our trained Mill Service Force is also available for field consultation. Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and National are registered trademarks

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Supply Division • United States Steel Export Company, New York

NEW Product Briefs

. . . there is always a BETTER WAY

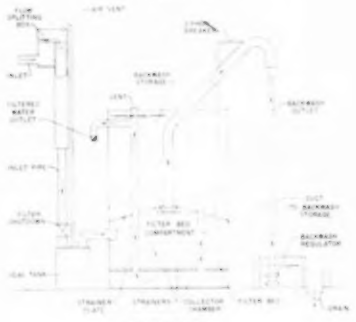
FOR MORE INFORMATION ON FOLLOWING ITEMS

Fill in Code Number on Return Card — Page 65

Valveless Filter

A-1 **The Permutit Company,** 53 West 43rd St., New York 36, N. Y., has introduced a new gravity water filter featuring low initial cost, and fully-automatic operation requiring not one watt of power.

PLAN



ELEVATION

To achieve this, design is built around a very old device: the siphon. Combined with a filter bed in a compartmented tank, this siphon performs the backwash operation automatically, and there are no pumps, valves, gauges, or manual or electric controls anywhere in the unit. Actuation of the backwash cycle is accomplished at exactly the optimum moment without any outside aid, the filter cannot over- or under-wash, and backwash or rinse water cannot be accidentally run to service. The unit operates on a loss-of-head and can be used wherever gravity feed is feasible.

Acoustical Ceiling

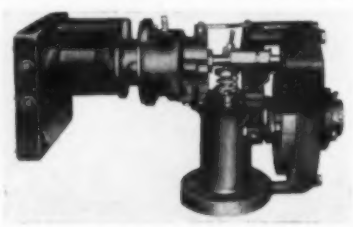
A-2 **Armstrong Cork Company,** Lancaster, Pa., has announced a new type of suspended acoustical ceiling that costs no more to install than ordinary plaster and metal lath, yet provides rated fire protection for structural steel, plus the advantages of sound absorption and dry installation.

The new ceiling, known as the Armstrong Acoustical Fire Guard lay-in system, employs special fire-resistant ceiling panels, approximately 2 x 4 feet in size, instead of tile. The panels rest in a unique type of exposed grid suspension specially designed to withstand the intense heat of a fire, and can be lifted out at any time for access to plumbing lines, air conditioning ducts and other concealed utilities.

Soot Blower Head

A-3 A new rotary soot blower head designed for indoor or outdoor installation has been announced by **Blaw-Knox Company, Copes-Vulcan Division,** Erie 4, Pa. It can use air, saturated or superheated steam, water or slurries — or any combination of these fluids — as the blowing medium without change in the equipment. It is built for service through the 1500 psi standard.

Installation may be on side wall or roof, horizontally or at any angle above the horizontal plane. Blowing pressure is externally adjustable. The blowing arc is easily changed in the field. All parts are accessible for inspection and maintenance.



Electric, air and manual drives are available. With electric or air drive, the head may be operated by individual push button, or used in an automatic-sequential or selective-sequence system in which blowing is controlled from a central panel.

Air Gap Motor

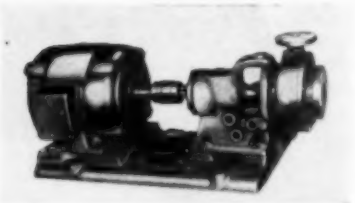
A-4 **Fairbanks, Morse & Co.,** 600 S. Michigan Ave., Chicago 5, Ill., has expanded its line of reduced dimension motors by addition of the LO-I radial air gap motor in the flange mounted construction.

This new motor features minimum overall length and reduced weight with low rotor inertia. It is designed for application where space limitations are critical and where fast acceleration, frequent start or reversing duty is required.

The new line includes ratings from ½ to 25 hp in speeds 900 through 3600 rpm in three basic frame sizes. Flexibility of application is maximized by several horsepower ratings in each mounting flange diameter. Four different flange diameters are available in 1, 1½ and 2 hp ratings and a 13" diameter flange may be suplied from 1 through 10 hp. NEMA standard D flanges and axial air gap motor flanges are both available for maximum interchangeability.

Open Impeller Pumps

A-5 Two sizes of a new line of single stage side suction open impeller pumps are now available from **Goulds Pumps, Inc.**, 216 Black Brook Rd., Seneca Falls, N. Y., to meet requirements where relatively small quantities of corrosive chemicals or slurries must be handled for heads up to 150 feet.



Designated as Model 3199, pumps have 1" flanged discharge and 1" and 1½" flanged suction connections. Flanges are flat face 150 lb standard. Standard assembly provides top vertical discharge, but horizontal top or bottom discharge position is also available. Frame has wide openings giving ready access to gland and stuffing box and is provided with cooling chamber to isolate bearings and prevent heat transfer to the bearings. Grease lubrication of the ball bearings is standard but oil lubrication can be furnished on order.

Impellers are statically and hydraulically balanced and are provided with ejector vanes on back wall to prevent entrance of solid material and to reduce stuffing box pressure.

Pumps are available in bronze fitted, all iron, all bronze, 316 stainless steel and Gould-Alloy 20.

Cation Resin Cleaner

A-6 **Ionac Chemical Company**, a division of Pfaudler Permutit Inc., Birmingham, New Jersey, has developed Cation Exchange Resin Cleaner #1112, a blend of selected inorganic chemical agents with high dissolving and dispersing properties, specifically to clean and lengthen the life of cation exchange resin beds in any installation which requires salt regeneration.

Dissolving rapidly in cold water, the cleaner removes contaminating coatings from the resin, and loosens silt. Iron, aluminum, carbonates and similar coatings react with the chemical agents to form soluble complexes which are removed easily by backwashing and rinsing. At the same time caked resin is loosened, and cleaned through removal of entrapped silt.

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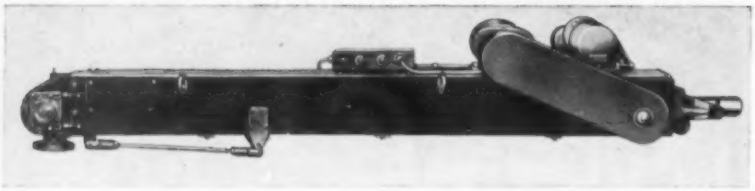
New Product Briefs (Continued)



Soot Blower

A-7 Two new long retractable soot blowers, designed for travels up to 24 feet and for either indoor or outdoor installation, have been announced by **Blaw-Knox Company, Copes-Vulcan Division**, Erie 4, Pa.

Both models feature dual-motor drive. One motor extends and retracts the lance. The other rotates it. Either traversing or rotating speed may be changed without affecting the other.

The Vulcan T-30 Mark I-E is electrically driven. The Mark I-A is air powered. In all other respects, the two models are identical. Their power packs may be mounted at any of several locations on the soot blower to avoid obstructions or high ambient temperatures.

Air, saturated or superheated steam, or water, or any combination of these fluids, may be used as the blowing medium without change in equipment.

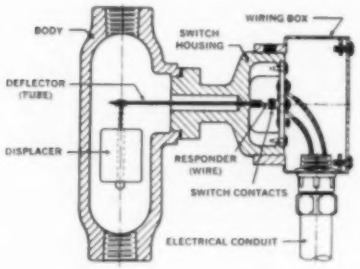
Asbestos Cloth

A-8 **Garlock Inc.**, 456 Main St., Palmyra, N. Y., is marketing a full line of plain weave asbestos cloth. The company uses the material as a component for a great many of its gasketing and soft packing products, and is now producing asbestos cloth beyond its own requirements.

The material up to and including AA Grade is currently available in 100 yard rolls in widths up to 48 inches.

Sensing Device

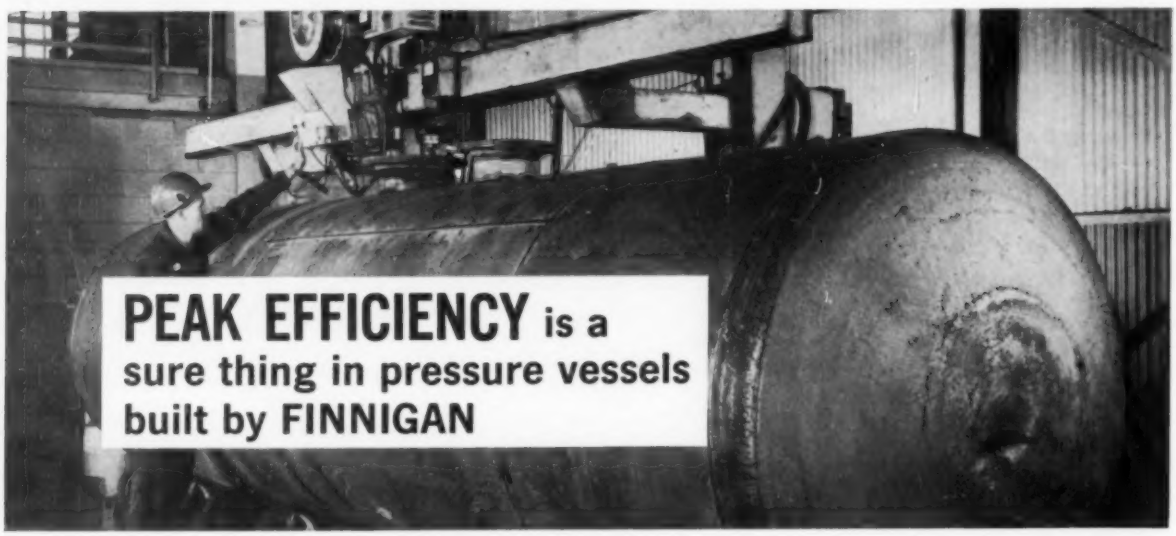
A-9 **Yarnall-Waring Company**, 102 E. Mermaid Ave., Philadelphia 18, Pa., is offering a sensing device for detection and control of process variables. It employs the patented W-I-T (Wire in Tube) element for transmitting



motion through a pressure-tight wall without bellows, seals, or stuffing boxes.

The element consist of a flexible, curved tube containing a spring wire. Deflection of the end of the tube by a change in level, flow or other variable causes rotation of the wire, which in turn may indicate the change or operate a switch.

The device can be used to in-



Finnigan Hot Water Generators are engineered to give you large quantities of hot water for low operating cost. The finest materials, creative skill and quality construction assure efficiency in Finnigan equipment. These generators are fabricated from corrosive-resistant materials and contain copper removable-coil heating elements. Before leaving the plant, each generator must conform to ASME, API, U. S. Government and other specifications. "Fabricated by Finnigan" is your assurance of quality.
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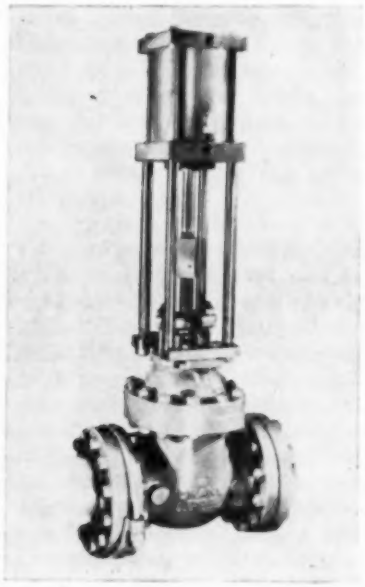
dicate or control critical levels in boilers, heaters and similar pressure vessels, and to control flows. It can actuate alarms, cut off fuel supplies, start and stop pumps.

Cylinder-Operated Valves

A-10 **The Crane Co.** Industrial Products Group, Chicago, Ill., announces the development of a universal type cylinder operator, adaptable to outside screw and yoke, iron body wedge or double disc gate valves, and to pulp stock valves.



Factory installed valves with cylinders are available, or the cylinders may be had in kit form for rapid in the field installation on Crane iron body hand-operated valves. Cylinder installation on valves already in service can be accomplished in 30 minutes or less.

The valves are actuated by a double-acting cylinder, using water, air, or oil as the operating medium. The cylinders are controlled by operation of a four-way valve, which may be located in any convenient place within a reasonable distance from the main valve. Fixed orifices in the cylinder ports maintain an operating speed of one inch per second, minimizing slamming and sticking. No cushions or speed controls are necessary. Seals are the "pressure sealing" type. Tube and seals are of Teflon, which is immune to damaging effects of all hydraulic fluids, air, water, and gases. A piston rod stem coupling provides visual indication of the valve disc position.

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For more information, Use Reply Card—Page 65

New Product Briefs

(Continued from page 61)

Pipe Dope

A-11 Pipe-Pac, a new pipe dope produced in tape form, is now being marketed by **Johns-Manville Corporation**, 22 East 40th St., New York 16, N. Y.

Useful in industrial applications for jointing metal, plastic, ceramic, rubber, and other pipe materials, Pipe-Pac will withstand temperatures from minus 300 F to plus 500 F. It can be used for pipe carrying air, oil, water, gas, steam, solvents and chemicals of all types, and corrosive materials. The tape will not cake or harden, and it will prevent freezing of the joint.

(Continued on page 73)

Atomics

(Continued from page 46)

distillation or any other method that requires heat producing equipment.

The system utilizes the ion exchange principle which entails the use of chemicals that convert dissolved trouble-causing minerals into compounds readily extractable from water. Now being used on a round-the-clock basis at a major semiconductor plant, the system produces 100 gallons per minute of water having a resistance of 24,000,000 ohms per cubic centimeter at 18 degrees centigrade.

Water purity is measurable in ohms, which are units indicating a substance's resistance to the flow of electricity. The greater the mineral content of water, the better it generally conducts an electrical current, and hence the less its resistance. It has been calculated that water free of any detectable mineral content would have a resistance of 24,000,000 ohms per cc —the resistance achieved by the new system.

High-purity water is needed in the production of television tubes, transistors, capacitors and other types of electronic components, as well as in the generation of atomic power.

Engineering Information

The Atomic Energy Commission has arranged to make available, at a price considerably below that previously charged, copies of engineering data and information covering virtually every aspect of the nation's nuclear energy program. The materials include drawings, photographs, sketches, design criteria, specifications and parts lists which have been prepared as part of various engineering and construction programs carried out by the AEC and its contractors.

Previously, the information sheets were reproduced by a photographic process and made available for sale. However, because of the reproduction process, costs were relatively high. In announcing the new program, Robert L. Shannon, Chief of OTI Extension, said an arrangement has been made with Cooper-Trent Blueprint & Microfilm Corporation in Arlington, Virginia, whereby the AEC will turn over to the firm all engineering data. Cooper-Trent then will produce blueline, or blueprint-type, copies which will be available for sale at 17 cents per square foot.

The principal objective of the Engineering Materials Program is the immediate and wide dissemination of AEC engineering information for use in advancing the peace-time applications of nuclear energy. By making these materials available rapidly and at a greatly reduced cost, we feel wider use will be made of the information by research organizations, educational institutions, manufacturers and individuals.

The engineering information is collected by OTI Extension and arranged into sets according to subject. The materials cover all phases of nuclear engineering, ranging from research and power reactor facilities and chemical processing plants to radiation instruments and laboratory equipment.

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catalogued the material and provided detailed information through supplements to the *Engineering Materials List* (TID-4100). For ready reference, each set is assigned a code number. OTI Extension will continue to provide these services. Comprehensive indexes to the List are issued semiannually by OTI Extension.

Copies of the *Engineering Materials List* and its supplements are available without charge from the Office of Technical Information Extension, Post Office Box 62, Oak Ridge, Tennessee. Requests for prints of engineering materials should be addressed to Cooper-Trent, 3710 Wilson Boulevard, Arlington 1, Virginia. Inquiries concerning materials which have not yet been announced in the *Engineering Materials List* or its supplements, should be addressed to OTI Extension at Oak Ridge.

Trace Measurements

Accurate measurement and continuous monitoring of trace quantities of oxygen and moisture in special gas atmospheres can be performed with a new Portable Furnace Atmosphere Analyzer developed by the Chemical Division of Engelhard Industries, Inc. The analyzer is designed particularly for producers of the "exotic" metals, semi-conductor materials and various electronic devices, all of which are frequently manufactured, processed or stored in protective atmospheres.

The analyzer can be used to continuously monitor oxygen and water vapor concentrations, giving very rapid response to changes, or it may be used for periodic checks. Particularly valuable in trouble-shooting or in the start-up of new or newly repaired or modified facilities is the fact that a sampling probe can be moved from point to point within a furnace, greatly facilitating the task of finding leaks.

Principal applications of the analyzer are in heat treating and crystal growing furnaces, storage dry boxes and assembly facilities used in the manufacture of semiconductor materials, transistors and other electronic devices in which the pickup of even minute quantities of undesirable impurities may have serious effects on performance and useful life.

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3—Metallizing—Use industry's low-cost "putting-on" tool. Now within reach of the smallest shop. Bulletin tells how you can spray carbon steels, stainless, babbitts, brass, nickel, aluminum.—METCO.

6—Tool Truck—Save time with this compact truck carrying full tool selection to emergency repair jobs. Four drawer unit described in Bulletin 8141-A. Semi-pneumatic 10" balloon tires ease heavy loads over rough pavements. — SNAP-ON TOOLS CORPORATION.

8 — Ceramic Coatings — Chempro sprayed ceramic coatings to resist abrasion, erosion and corrosion described in Bulletin CP-28. Ideal for shaft, shaft sleeves, impellers, valves, cams.—CHEMICAL & POWER PRODUCTS, INC.

10—Floor Maintenance — Catalogs show how to maintain floors faster for less money with Lincoln-Wilshire automatic scrubbers, power sweepers and polishers. — AMERICAN-LINCOLN CORP.

14—Hose & Fitting Needs — Complete Weatherhead line described in bulletins — flared, flareless, or pipe fittings; brass, stainless, carbon; pressures to 10,000 psi; sizes ⅛" to 2" O.D.; production or small maintenance quantities. — DIESEL INJECTION SALES & SERVICE.

18—Maintenance Ideas—4-page folder highlights 90 ways Kano Kroil and other products can help the man-in-the-plant. — KANO LABORATORIES.

24—Roof Maintenance—4 page Catalog 5D describes Dri-N-Tite products for patching, priming and coating composition, corrugated or sheet metal, slag, gravel, concrete and felt roofs. — A. C. HORN COMPANIES.

27 — Corrosion Control Systems — Brochure 9111 outlines five-step procedure for primary protection and preventive maintenance of all metal surfaces subject to acids, alkalis, solvents, fumes and gases. — TRUSCON LABORATORIES.

38—Heavy-Duty Wrench Set — Bulletin 8141-C details the Loxocket 521-EHD-B. Metal case containing 17 sockets from 1 7/16" to 3⅛", ratchet, sliding bar and two extensions — 8" and 16" — ready to go on any assignment. — SNAP-ON TOOLS CORPORATION.

64 — Anti-Corrosive Paints — Bulletin, "The Application of Subox and Subalox Paints," gives the story of a complete paint system for weather, moisture and alkali protec-

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tion, with details as to application.—SUBOX INC.

66—Tube Expanding — Bulletin 55 on torque control describes automatic air driven tube expander drive. Control assures uniformity of tube expanding.—THOMAS C. WILSON, INC.

75—Storage Racks — How you can build them faster with Kee Klamp slip-on fittings described in Catalog K-25-D. Allen wrench only tool needed. Simple to erect; easy to dismantle. 58 varieties for pipe sizes ⅜" to 2". — KEE KLAMPS.

77—Plant Health Aid — Automatic footsprayer dispenses skin-toughening solution for prevention of athlete's foot. One gal of solution sufficient for 3,000 treatments. Catalog S-12 gives details. — ONOX, INC.

95—Plant Lubrication — The Lubriplate Service Handbook — Gives valuable information on lubrication in all its forms for everyday use of plant superintendents, managers, maintenance engineers and those in charge of plant production and maintenance. — LUBRIPLATE DIVISION, FISKE BROTHERS REFINING CO.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

100—Power Plant Pumps—Bulletin BJP 58-8 covers complete line of standard pumps for power plant requirements—from 12,000 hp, double-case boiler feed pump, to condensate, circulating and booster pumping duty. Also, special pumps for nuclear power plant installation. — BYRON JACKSON PUMPS, INC.

122—Industrial Fans — Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm pressures to 18" SP. Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. —CLARAGE FAN CO.

128—How to Solve Pumping Problems — 36-page booklet gives general explanation of rotary gear pumps and factors involved in pumping; three sample problems; technical data — graphs and tables. —ROPER HYDRAULICS, INC.

135—Heat Exchanger — Bulletin 132 shows how sectional Aero unit gives close temperature control, saves labor, power, and water; design improves heat transfer to outdoor air by evaporation; 7,000,000 to 18,000,000 Btu/hr capacity range. —NIAGARA BLOWER COMPANY.

157—Pumps for Corrosive Liquids—4 page Bulletin 5252-J describes 8 centrifugal pumps particularly adapted for handling corrosive liquids. Useful chart shows materials of construction available. Sizes, ratings, etc., briefed. — GOULDS PUMPS INC.

160—Boiler Feed Pumps — 12 page Bulletin 122 describes and illustrates the type BFI high pressure pumps. Design features, service ratings and engineering data included. — PACIFIC PUMPS, INC.

INSTRUMENTS—METERS CONTROLS—REGULATORS

207—Control Centers & Systems — Combustion safeguard and automation packaged control centers insure full coordination of complete system, place responsibility on one source, insure correct wiring, and reduce field labor. Catalog C11 illustrates variety of designs and circuits now in use. — WEBSTER ENGINEERING CO.

211—Butterfly Valves — Folder supplement to Catalog 307 stresses flexibility in valve line for controlling large volumes of liquids or gases. Valve actuators, special arrangements, shaft extensions, and electric actuators and positioners are featured. — MASON-NEILAN.

212—Self-Powered Controls — Bulletin 620 describes self-powered automatic temperature regulators — no compressed air or electrical wiring required, no delicate mechanisms to adjust, no packing glands to stick, no shut-down due to power failure. — SARCO COMPANY, INC.

223—Combustion Control — Bulletin 1023, 24 pages—Contains installation photos and diagrams of Bailey air operated combustion control for oil and gas fired boilers; two pages of chart records and six page list of typical installations. — BAILEY METER COMPANY.

224—Feedwater Regulator—Bulletin 1044 describes the BI Feedwater Regulator, the single-element unit employing a thermostatic-tube level controller which actuates a regulating valve in feed line. For loads from 10 to 785 psig. Includes specifications table and schematic diagram. — COPES-VULCAN DIV.

228—Fuel Cut-Outs & Water Level Alarms — Brochure D2 — Electrode type equipment for installation on water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

235—Liquid Level Gauges—Bulletin 463A describes automatic remote reading systems for nearly any liquid. Features include easy to read dial indication. — LIQUIDOMETER CORP.

255 — Temperature Regulators — "Sliding Gate" units are simple, low cost, self-operating, automatic control valves for heating or cooling applications. Action easily reversed by rotating seats 180°; self-powered —no electricity or compressed air needed; easy to install. Bulletin J-180-1 describes ten standard ranges from 35-450 F. — OPW-JORDAN.

293—Metering & Control Systems — Bulletin 500, 4 pages, discusses pneumatic and electric telemetering. Covers components making up the systems. — BAILEY METER CO.

295—Two Fuel Cut-Out Controls in One — Float operated and electrode-operated fuel cut-out functions contained in one device. Bulletin D2.5 describes convenient optional hook-up possibilities, for pressures to 350 psi. — RELIANCE GAUGE COLUMN CO.

PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

300—Buyer's Guide—Up-to-date industrial and maintenance building products stock list. Includes complete listing of all Rasco distributed products plus branch locations. — REYNOLDS ALUMINUM SUPPLY CO.

301—Vacuum Cleaning Systems — How portable and station systems cut costs and increase plant efficiency shown in Booklets P8 and AB-100. Eight heavy duty units (1½ to 15 hp) for cleaning hard to get at areas, reclaiming valuable materials. —U. S. HOFFMAN MACH. CORP.

306—Steel Buildings — Shed roof, gable roof frameless and gable roof rigid frame units described in Catalog SX-13757. 5,000 sizes available to meet all space needs.—ARMCO DRAINAGE & METAL PRODUCTS, INC.

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310—Incinerator — Metal cased, insulated, refractory lined incinerators for industrial and commercial use. City smoke code approved. Fast, economical installation — any size and capacity. — NORTH STATE PYROPHYLLITE CO.

314—Plant Heating Units — Infra-Red comfort heating gas-fired units with no moving parts described in Bulletin PC 1-60 G. AGA and UL approved. —PANELBLOC DIV., BETTCHER MFG. CORP.

315—Pressure Vessels — Catalog 100 discusses plate fabrication problems and shows how company custom-fabricates hot water storage heaters, tanks, air receivers, blow-off tanks. Corrosion resistant linings and materials featured. Suggested specifications and other valuable technical data given. — J. J. FINNIGAN CO.

317—Drier Compressed Air—Bulletin 130 shows how Aero After Cooler cools compressed air or gas below temperature of surrounding atmosphere; no further condensation in air lines. Installed outdoors. Saves cooling water. Gives better operation of air-operated tools—NIAGARA BLOWER COMPANY.

321 — Storage Hot Water Tanks — Tanks to 6,570 gal and heating elements to 33,000 gpm covered in Catalog BH-2N. Includes dimensions,

pressures, weights and prices. Three methods of protective linings are described and priced. — THE SIMS CO.

324—Painting New Plants — "Plan Painting of New Plants to Reduce Costs" describes how lead-suboxide paints can save 1 or 2 coats of paint on new plants. Eventual repainting costs are cut as well since these paints form a dense, metallic lead film which can be recoated without expensive scraping, sanding or repriming. — SUBOX INC.

325—Water Storage — The Cylindroid, a functional design for large-volume, low-cost, ground-level water storage described in 4-page catalog. Light steel construction, and smaller field erection crew are among savings over standard ground-level tanks. — GRAVER TANK & MFG. CO.

332—Heat Transfer Equipment — If you have material to liquefy, heat, vaporize, superheat, condense, cool or solidify, check Bulletin HE-8 describing exchangers designed for temperatures as low as minus 160 F and as high as 1600 F with pressures ranging from vacuum to 9500 psi. — HENRY VOGT MACHINE CO.

335—Classifying Systems — Bulletin explains general operating characteristics of centrifugal and gravitational type classifiers. Curves illustrate high efficiencies achieved in actual installations and indicate particle size distribution of incoming feed, separated fines and coarse material. — BUELL ENGINEERING CO., INC.

342—Power Roof Ventilators — Bulletin 550 describes V-belt driven centrifugal type power roof ventilators. Pressures to 2" SP; capacities from 1500 to 26,500 cfm.—CLARAGE FAN CO.

347—Chemical Feeders — 34 page Catalog 1136 helps you select the exact metering pumps needed to meet any requirements. —MANZEL.

355—Steam-Jet Cleaners —Bulletins JC-100 and SB-200 describe steam - jet cleaners. Series "R" Speedylectric generates steam to 250 psig and temperatures to 405 F. Larger cleaners available. — PANTEX MFG. CORP.

365—Storage Water Heaters — Gas-fired, Scalefree 230 units described in Bulletin 4. Fully automatic package requires only simple connections. Available in more than 100 storage and recovery combinations. Storage capacities range from 250-4,000 gal. — THE PATTERSON-KELLEY CO.

370—Industrial Fence — You can eliminate pilferage, control traffic, and improve plant appearance most economically with Anchor Chain Link Fences. Catalog gives case studies from other plants in South-Southwest. — ANCHOR FENCE.

386—Rigid Frame Buildings—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bowstring truss all-steel roof systems; fabricated for rapid erection — ATLANTIC STEEL COMPANY.

390—Tank Insulation — An uninsulated tank is like a giant radiator heating the outdoors — and that costs money. 8-page Ultralite Tank Brochure tells you how you can save over 90% of this heat loss with glass fiber blankets. Can pay for itself in six months to a year. — GUSTIN-BACON.

PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

401—Steam Traps — Bulletin 775 gives price, dimension and capacity data on Open Float and Thermostatic Steam Traps for trouble-free heating service.—ARMSTRONG MACHINE WORKS.

403—Valve Operators—Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

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See pages 65 & 66

407—Piping Materials—Bulletin reports on intensive investigation into problem of main steam piping materials and gives data on stress rupture characteristics of Types 316 and 347 stainless steel piping adjacent to welded joints.—PITTSBURGH PIPING AND EQUIPMENT COMPANY.

409—Lubricated Plug Valves—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. —THE WM. POWELL COMPANY.

410—Flexible Connectors—How all-metal connectors absorb piping vibration described in Catalog 1D-100C. Convey corrosives, simplify misaligned hookups, and save installation time. Bronze, carbon steel and stainless steel. —UNIVERSAL METAL HOSE CO.

414—Acid Resistant Pipe — 4 page technical brochure covers properties of Union 20-S stainless steel. Alloy can be welded and put into service without subsequent annealing. Shows comparative resistance to 94 different corrosive agents. — REYNOLDS ALUMINUM SUPPLY CO. — UNION STEEL CORP.

429—Expansion Joints —Advantages of the Gun-Pakt expansion joint described in Bulletin EJ-1917. No shutdowns for repacking. Installational suggestions. — YARNALL-WARING COMPANY.

443—PVC Fittings & Flanges—Corrosion resistant polyvinyl chloride pipe fittings and flanges covered in 12 page catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures and field tests. — GRINNELL COMPANY, INC.

452—Pipe and Tubes—42 page Bulletin 26 gives types of steel tubes, tensile, creep and rupture properties, welding and forming data, applications and other valuable information. — National Tube Div., UNITED STATES STEEL CORP.

458—Stainless Valves—Catalog gives complete technical data on stainless steel valves for all purposes. Over 100 valves diagrammed and described. — REYNOLDS ALUMINUM SUPPLY CO. — COOPER ALLOY CORP.

461—Reducing Valves—Bulletin 1027 describes diaphragm and piston operated regulating valves for pressure, temperature and liquid-level control. Complete specifications. — COPES-VULCAN DIV., BLAW-KNOX CO.

463—Stainless Steel Valves — Catalog 59 SS describes line of gate, globe and swing check valves with details of valve patterns in alloys that satisfy requirements of most corrosive services. Includes section to show degree of resistance of alloys to many corrosive media under varying conditions. — JENKINS BROS.

479—Multiport Drainers — Publication 5201, 8 pages, describes units for removing large quantities of condensate under vacuum or pressures, as from evaporators, heaters, separators, coils, or steam lines (up to 200 psi). Lists discharge capacities, shows typical installations. — COCHRANE CORPORATION.

488—Power Piping Field Erection — Increased importance of piping erection proficiency is stressed in new 12-page brochure. Tells how field erection costs and quality are controlled and discusses welding and other technical aspects.—THE M. W. KELLOGG COMPANY.

493—Unions & Swing Check Valves—Engineering data, sizes, weights and dimensions on Perfect Seal Pipe Unions and Swing Check Valves featured in 20-p Cat. 60. Also includes Gasketless Cup-Orifice Unions and Ductile Iron Check Valves. — CATAWISSA VALVE & FITTINGS CO.

497—Stainless Fittings — Welding fittings and forged flanges described in booklet. All specifications are included for Taylor line. Drawings and diagrams. — REYNOLDS ALUMINUM SUPPLY CO. — TAYLOR FORGE.

BOILERS—STOKERS TURBINES—BURNERS

501—Packaged Steam Generators — DK units described in bulletin: 24 sizes for gas, oil or combination

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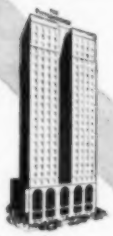

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509—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY.

510—Vibra-Grate Stoker—Completely water cooled stoker described in Catalog S-546-A. Burns wide range of coals efficiently; minimizes cost and time for maintenance; smokeless operation regardless of steaming rate; eliminates need for dust collector. — AMERICAN ENGINEERING COMPANY.

516—Small Boiler Performance — 4 page bulletin shows how the packaged Ljungstrom air preheater boosts performance. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels. — THE AIR PREHEATER CORPORATION.

521—Gas Tempering —How you can burn the most economical fuel available (coal, oil or gas) described in Bul. G-96. Cuts overall plant costs since smaller size unit requires smaller building per kw. — THE BABCOCK & WILCOX CO.

527—Pneumatic Spreader Stoker — Bulletin shows how unit combines coal drying, metering, conveying, uniform burning and cinder return in one efficient system. — IRON FIREMAN MFG. CO.

532—Economical Steam — Forced draft, pressurized gas or oil fired units described in SB-59 catalog. Two-drum water tube units include steam trim, draft equipment, burner and combustion safety controls. — ERIE CITY IRON WORKS.

535—Unit Steam Boilers — Catalog AD-100 — Gives complete information on oil and gas fired "Self Contained" boilers, 15 to 500 hp, 15 to 250 psi for processing and for heating. Gives features, applications, efficiencies, capacities and dimensions.—CLEAVER-BROOKS CO.

536—Automatic Boiler-Burner Unit —Assembled plant (Scotch-type, two-pass) for all heat or power applications; for low pressure or high pressure use; burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil. Easy maintenance. Bulletin SPI-100 gives details. — INDUSTRIAL COMBUSTION, INC.

547—Gas and/or Oil Burners — Bulletin B1 describes large or small, single or dual fuel, packaged or field assembled, atmospheric or forced draft burners; electronic of all types; competent sales and service. —WEBSTER ENGINEERING CO.

551—Packaged Water Tube Boilers —Complete data and dimensions for boilers ranging from 8,000 to 50,000 lb/hr, firing oil or gas or both, described in 12 page Catalog 111-D. — SUPERIOR COMBUSTION INDUSTRIES, INC.

557—Coal — Current brochure on "Prescription Coals." — A. T. MASSEY COAL CO., INC.

567—Boiler Equipment — New data on steam generators in sizes to 500,000 lb/hr, for high or low steam pressures and temperatures, for all types of fuel and firing methods. — WICKES BOILER CO.

574—Packaged Generator — Bulletin 582 describes Vapormatic Coil-N-Shell Steam Generator for service requirements of 5 to 150 psig. Gives operation features and specifications. Available with gas, oil, and combination gas/oil fuel systems. — TEXSTEAM CORP.

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590—Packaged Rotary Burner—Fully automatic Roto-Pack forced draft units described in Bulletin; 6 sizes, 7 types to fit all automatically fired boilers or furnaces. Burn all grades of fuel oils, gaseous fuels or combination of both. —TODD SHIPYARDS CORPORATION.

ENGINES—DRIVES POWER TRANSMISSION MATERIAL HANDLING

600—Mechanical Shaft Seals—Chempro mechanical external seal described in Bulletin CP-551. First seal designed for complete interchangeability with packing. No mounting clamps, machinery stuffing box faces or drilling holes. Install in 30 min. Adjust after installation. — CHEMICAL & POWER PRODUCTS, INC.

606 — Retaining Ring Kits — 400 Truarc cadmium plated rings — 84 sizes in one economy kit. Sizes from ¼ to 2½ in. in three most used series of internal, external and universal crescent ring designs — $34.50 per kit. — DIXIE BEARINGS, INC.

610—Flexible Couplings — Catalog 60 describes couplings for maintenance-free power transmission — no lubrication, and no wearing parts. Recommended basic coupling arrangements and load classifications are featured.—THOMAS FLEXIBLE COUPLING COMPANY.

635—Bearings & Bars — Pocket size edition 158 gives complete list of cast bronze and sintered bronze bearings and bars. Bearing aluminum bar data included. —THE BUNTING BRASS AND BRONZE COMPANY.

641—Belt Conveyors — Cat. ID-591, 88 pages, shows principal belt conveyor products, including heavy duty and standard roller bearing and precision ball bearing idlers. Comprehensive Engineering Data section contains simplified and condensed information for proper selection. — CONTINENTAL CONVEYOR & EQUIPMENT CO.

651—Bearing Aluminum Bars—Aluminum bearings can replace bearings of other metals which cost twice as much. No sacrifice in performance or life. Catalog 46 covers composition, machining and use. — THE BUNTING BRASS AND BRONZE COMPANY.

WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

701—Exhausting Corrosive Fumes—Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans. — CLARAGE FAN CO.

703—Air Conditioning—Bulletin 122 describes and illustrates operation and suggests applications for air conditioning method that controls humidity to 1% rh and temperature to 1 F (up to 140 F) with accuracy, independent of moisture sensitive instruments. — NIAGARA BLOWER CO.

705—Test Your Tower—Bulletin offers simple, proven method of determining how closely actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. — THE MARLEY COMPANY.

711—Refrigeration Condensers—Bulletin RC-2 shows how Vogt condensers step up rate of heat transfer and step down head pressures. Closed type for clean water; film type where water is hard and forms scale. Units save power and refrigeration cost. — HENRY VOGT MACHINE COMPANY.

713—Electric Precipitators—26 page Bulletin 104 shows how units meet five engineering requirements —Positive control of gas flow; high, uniform electrode emission; effective continuous cycle rapping; and safe, trouble-free high voltage equipment. Gives 9 steps to successful installation. — BUELL ENGINEERING COMPANY, INC.

756—Refrigeration Problems?—VMC compressors, intercoolers, chillers, described in Bulletin 817 — design improvements, protective devices and factory-run-in-tests.—THE VILTER MANUFACTURING COMPANY.

764—Cooling Equipment — Bulletin 80-D describes company's complete line of commercial and industrial equipment — operating principles, design features.—FRICK CO.

ELECTRICAL

801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process

and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

803—Power Control — Bulletin describes design, manufacturing and consulting services for motor control centers; switchgear; power centers; specialty, mechanical and automation control requirements. — POWER CONTROL COMPANY.

807—Motor Bearings — Catalog 258 gives complete listing of cast bronze motor bearings for all makes and sizes. — THE BUNTING BRASS AND BRONZE COMPANY.

813—600-Volt Wiring — How Anaconda Densheath 900 offers long life, high heat and moisture resistance, chemical stability and easy installation is described in Bulletin DM-5612 — ANACONDA WIRE & CABLE CORP.

816—High Voltage Protection — 36 page catalog of linemen's protective equipment describes products for utility and industrial electrical fields. — CHARLESTON RUBBER COMPANY.

820—Electrical Maintenance — New contract service (for Southeast only) inspects and tests motors, generators, gearing, control and distribution systems, at a cost less than 1% of value of equipment. — Atlanta Office of WESTINGHOUSE ELECTRIC.

871—Electrical Protection — Handbook tells how to select protective devices for circuits, motors and apparatus. Condenses all '59 Code references covering protection problems. Explains how installation costs can be cut and space saved with Dual-Element fuses. — BUSSMANN MFG. DIV.

Late Bulletins

M-100 — Check Valves — Catalog Sheets 1535-36-37A, present information on new line of machinery check valves including angle, in-line, and gasket-mounting types. — PARKER-HANNIFIN CORPORATION, 17325 Euclid Ave., Cleveland 12, Ohio.

M-101—Fuse Panels & Switches — Product Guide, 20 pages, gives installation and application data on fuse panels, service entrance equipment, and switches. — THE AMERICAN ELECTRIC SWITCH DIVISION, THE CLARK CONTROLLER CO., 1146 E. 152nd St., Cleveland 10, Ohio.

M-102 — Tubing Steels — Bulletin T-456, 4 pages, shows chemical analyses of standard carbon, alloy and stainless tubing steels for corrosion resistant, elevated temperature and/or pressure service. TUBULAR PRODUCTS DIVISION, THE BABCOCK & WILCOX COMPANY, Beaver Falls, Pa.

M-103—Electronic Controls — Electronic Handbook, 18 pages, answers questions concerning use of electric and electronic controls in air conditioning applications.—AUTOMATIC CONTROLS DIVISION, BARBER-COLMAN COMPANY, Rockford, Ill.

M-104—Material Handling — Bulletin No. 80, 32 pages, catalogs heavy duty trolley busway electrical distribution systems for cranes and hoists, machine tools, conveyor assembly lines and other moving equipment. — FEEDRAIL CORPORATION, 125 Barclay St., New York 7, N. Y.

M-105—Cast-Tooth Sprockets—Book 2867, 12 pages, gives selection data based on sprocket-to-chain relationship for 132 different chain numbers and 48 sprockets. Illustrates major types. — LINK-BELT COMPANY, Dept. PR, Prudential Plaza, Chicago 1, Ill.

M-106—Regulators & Valves — Bulletins 136, 151, 152, give features and specifications on six pressure regulators and valves for a variety of industrial applications. — AMERICAN METER COMPANY, 920 Payne Ave., Erie 6, Pa.

M-107—Sensing Device — Bulletin RI-1825, 2 pages, describes new W-I-T (Wire in Tube) leakproof sensing device for detection and control of process variables. — YARNALL-WARING COMPANY, Chestnut Hill, Philadelphia 18, Pa.

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M-108—Coated Steel Tubing—NIPHOS Bulletin, 8 pages, discusses use of nickel-alloy-bonded steel pipe and tubing to counter corrosion and iron contamination, with recommendations for applications. NICKEL-OVER-STEEL DIVISION, M. L. SHELDON & CO., INC., 350 Lexington Ave., New York 16, N. Y.

M-109—Gas Turbines — Bulletin GED-5685, 16 pages, describes a new dimension in power, the Model 720 and 722 industrial gas turbines. Points out versatility in current applications, reviews engine specifications and services. — GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y.

M-110 — Insulation — Descriptive Sheets No. A-513 & A-515 — Spun mineral wool felts and bonded mineral wool blankets are covered, including a list of principal recommended uses of each product.—THE EAGLE-PICHER COMPANY, American Bldg., Cincinnati 1, Ohio.

M-111—Ball Valve — Circular 611, 2 pages, details the operation of a new top-entry bronze ball valve, gives design features, dimensions, and reports on applications. — LUNKENHEIMER CO., Cincinnati 14, Ohio.

M-112—Squirrel-Cage Motors —Bulletin No. 6100.1, 8 pages, describes design, performance characteristics, and size range of redesigned line of squirrel cage induction motors featuring Multiguard imbedded windings. — THE LINCOLN ELECTRIC COMPANY, Cleveland 17, Ohio.

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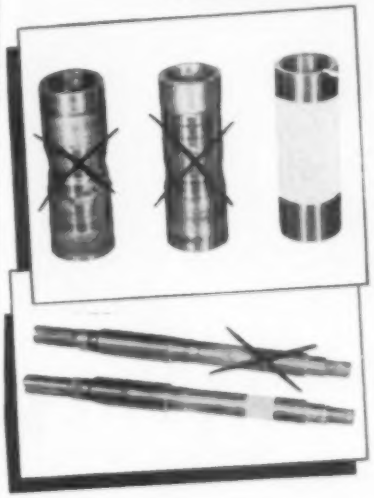

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M-113—Work Gloves — Charco Catalog, 24 pages, illustrates and describes all of the company's industrial protective products, with emphasis on Neoprene and synthetic rubber protective gloves. — CHARLESTON RUBBER COMPANY, 50 Stark Industrial Park, Charleston, S. C.

M-114—Small-Capacity Valves—Catalog Sheet, 2 pages, covers the Type F and Type FS pressure reducing valves for use with steam, water, gas and air to initial pressures of 500 psi. — ATLAS VALVE CO., 280 South St., Newark 5, N. J.

M-115—Liquid Phase Heater — Bulletin No. 4023, 8 pages, gives complete specifications for the Hi-R-Temp liquid phase heater available in sizes from 1,250,000 to 4,375,000 Btu. — VAPOR HEATING CORPORATION, 80 E. Jackson Blvd., Chicago 4, Ill.

M-116—Single Shaft Turbine — Bulletin 186, 6 pages, presents the new Model 305-S single shaft gas turbine for mechanical and generator drive, gives dimensions and specifications, and discusses applications. — CLARK BROS. CO., DIVISION OF DRESSER INDUSTRIES, INC., Olean, New York.

M-117—Mechanical Tubing — Booklet T-459, 8 pages, covers electric-resistance-welded carbon steel mechanical tubing Lectrosonic cylinder tubing, and hydraulic line tubing. — TUBULAR PRODUCTS DIVISION, THE BABCOCK & WILCOX COMPANY, Beaver Falls, Pa.

M-118—Screw Conveyors — Bulletin 83-A, 8 pages, describes standard and industrial gas-tight screw conveyors, with specifications, photographs, and ordering information.—SPROUT, WALDRON & CO., INC., 130 Logan St., Muncy, Pa.

M-119—Welded Steel Tubing — Brochure, 16 pages, provides tables for weight computations for welded steel tubing, including round mechanical tubing up to 10 in. square and rectangular tubing up to 5 in., and pressure tubing up to 5 in. — JONES & LAUGHLIN STEEL CORPORATION, 3 Gateway Center, Pittsburgh 30, Pa.

M-120—Vertical Package Compressors — Catalog V-100, 8 pages, describes line of vertical package compressors, standardized for 125 psi in sizes 50-2000 hp. Models for belt or direct drive are included.—BURY COMPRESSOR CO., Erie, Pa.

M-121—Lighting Lease Plan—Booklet SA-8865, 4 pages, tells how the lease plan for lighting equipment operates and presents a guide for determining rental payments. — WESTINGHOUSE LIGHTING DIVISION, Edgewater Park, Cleveland, Ohio.

M-122 — Storage Water Heaters — Bulletin 61, 8 pages, introduces "NiaWel" line of storage water heaters, with specifications covering 55 sizes in both vertical and horizontal models.— NIAGARA WELDMENTS INC., 55 Portage Road, Niagara Falls, N. Y.

M-123—Open Blast Burners — Data Sheet No. 1 B-4, 4 pages, includes performance curves, application data, selection, and specifications of gas-fired infra-red burner for low-temperature industrial processing applications. — BRYANT INDUSTRIAL PRODUCTS CORPORATION, 17700 Miles Ave., Cleveland 28, Ohio.

M-124—Manual Loading Panels — Folder describes Masoneilan manual loading panels for remote manual control of pneumatically operated valves, cylinders and other devices, with specifications for two units. — MASON-NEILAN, DIVISION OF WORTHINGTON CORPORATION, Norwood, Mass.

M-125—High Temperature Coatings Bulletin 1570, 20 pages, describes coatings and suggested use, and includes High-Temperature Coating Selector for requesting right-the-first-time recommendation. — THE DAMPNEY COMPANY, Hyde Park, Boston 36, Mass.

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M-126—High Volume Pumps — Bulletin B-148 describes "Hydro-Foil" pumps, designed to permit effective control of huge volumes of water, available in axial flow propeller type or mixed flow type, both in single or multi-stage. Illustrations show components and typical arrangements. — PEERLESS PUMP, Hydrodynamics Division, Food Machinery & Chemical Corp., 301 W. Ave. 26, Los Angeles 31, Calif.

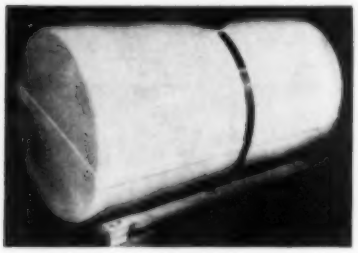
M-127—Tachometers—Catalog 62, 12 pages, covers continuous, indicating, portable and fixed types of tachometers in 19 models for speed measurement, production control, quality control, economical and safer operation. Includes specifications and various drive arrangements.—JONES MOTROLA CORPORATION, 432 Fairfield Ave., Stamford, Conn.

M-128—Tank Heaters—Bulletin 300, 8 pages, catalogues vertically mounted heaters for large storage tanks; horizontally mounted heaters for working tanks and where low liquid level heating is required; immersion type tank heaters for use with tank cars and trucks. Applications, dimensions, and other data included. — BROWN FINTUBE COMPANY, 300 Huron St., Elyria, Ohio.

New Product Briefs (Cont. from Page 62)

Fiberglass Tank

A-12 **Hill Engineering Company,** 516 North Sterling, Sugar Creek, Mo., has announced a new 200-gallon fiberglass tank for storage of corrosive chemicals and other liquids.



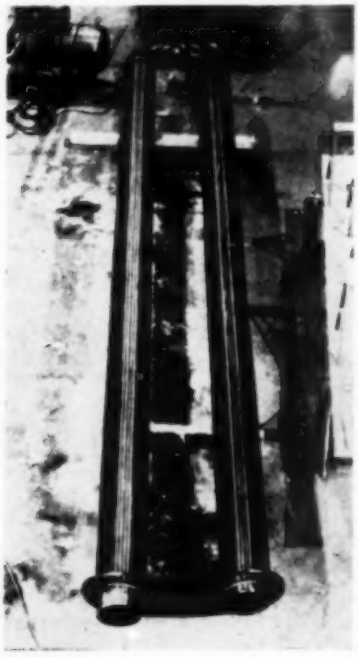
The tank has a fluid level gauge. Special fittings can be installed to customers' specifications. Custom tanks and other fiberglass parts can be manufactured to meet exact requirements.

Immersion Heaters

A-13 **The Brown Fintube Company,** 300 Huron St., Elyria, Ohio, announces a line of fired immersion heaters with improved heat transfer and thermal characteristics.

These U-shaped units are used to heat or maintain at pumping temperatures asphalt and heavy oils in tanks for loading, blending or storage purposes. Made in two sizes, on 8" and 10" diameter tube, they are also used on fluids where no steam supply is available or where asphalt and Bunker C oil must be heated to temperatures higher than normal steam practice allows.

Fired with either gas or oil, the 8 inch firetube has a capacity of 750,000 Btu/hr, and the 10 inch firetube 1,250,000 Btu/hr. Higher capacities are obtained by installing multiple units.



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Multiple Positioning

A-14 **Hanna Engineering Works,** 1765 Elston Avenue, Chicago 22, Ill., has developed a new electrical-mechanical servo device.

The "Hanna-Powr Positioner" automatically positions machine tools, valves, float levels, doors, and hopper-gates at any of the several predetermined positions, corresponding to a control selector switch signal.

It is used in conjunction with various types of power mechanisms such as an air or hydraulic cylinder, along with solenoid valves applied to operate a pipe line flow valve. By turning or pressing the position selector control switch in the pipe line control office, the valve will be opened or closed at any of several selected positions. A return read-out signal light indicates when the predetermined position of the pipe line valve has been achieved.

(*Continued on page* 75)

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New Product Briefs (Continued)

High-Temperature Coatings

A-15 **The Dampney Company,** Hyde Park, Boston 36, Massachusetts, announces a complete line of silicone and silicone-ceramic heat-resistant coatings for maintenance and OEM use.

Ten new high-temperature coatings cover the entire temperature range from low through moderate to extreme high heat, air dry or heat cure in service, and are available in any color as well as aluminum. Basic factors determining selection are actual skin temperature of metal, normal and peak, and rate of heat rise; corrosive environment, if any; and atmospheric exposure.

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See pages 65 & 66

Ball Valves

A-16 **The J. L. Putnam Company, Inc.,** Biddeford, Maine is offering a new line of 3" through 6" full port bubble tight ball valves in many materials. The

valves are manufactured in both the 150 pound and 300 pound series. Non-standard flanged valves are available as special items.

The full port in the valve's sphere is as free and open as the pipe the valve fits. This sphere is sealed with dual compressive seats which are filleted for longer wear and precision engineering has resulted in lower torque. The valve requires no lubrication. Pressure or vacuum can be handled in either direction. Remote control operators can be supplied for plants using automation.

Visible Drain

A-17 A new type of drain for attachment to any tank, sump or line that needs periodic draining, such as compressed air tanks or air lines, has been

announced by **Wilkerson Corporation,** 1667 W. Girard Avenue, Englewood, Colorado. Equipped with a transparent bowl with a drain cock in the bottom, the new drain provides a visible sump which, when full, can be manually drained.

This drain has no mechanism to foul, and requires only one connection. It can be threaded onto any tank outlet or to any line, using reducers or bushings, if necessary. Inlet is ½" female P.T., and the overall height is 6¾". It is 5" in diameter at the widest point. Transparent sump capacity is one pint. The unit is usable for pressures up to 150 psi and temperatures up to 120 F.

Photoelectric Relays

A-18 **Electric Eye Enterprises,** 1935 N.W. 191st St., Opalocka, Fla., is offering an improved photoelectric relay and light projector, featuring a circuit to obtain maximum lamp life without decreasing efficiency. Applications include counting, signalling, alarming, and controlling conveyors, machines, and other operations. The device is waterproof, dustproof, and vibration-proof. It can operate in any position and requires no warm-up time.

The relay operates directly connected to 105-130 volts 60 cycle line

STOP

athlete's foot with ONOX® skin toughener

Skin specialists say the best way to prevent Athlete's Foot is to increase the skin's resistance to fungus growth*. That's what Onox does. It keeps your feet as tough and healthy as your hands. Used by clubs, schools, and over 70% of the largest U. S. companies for the treatment and prevention of Athlete's Foot.

*American Pub. Health Assoc., Oct. 15, 1954

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  Write for "Facts on Athlete's Foot" including medical opinions.

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SPROCKET RIM
with Chain Guide
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SAFETY ZONE

— saves you money

ON EVERY VALVE

Every minute saved is money in your pocket. Cut out the waste of time, labor, floor space due to hard-to-reach valves. At the same time, convert Danger Zones to Safety Zones. Equip every overhead valve in your plant with Babbitt Adjustable Sprocket Rims with Chain Guides for day to day economy.

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- They fit any size valve wheel.
- They are easy to install and operate.
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- The first cost is the only cost (no maintenance).
- They are packed completely assembled (one to a carton), with easy-to-follow instructions.
- A hot-galvanized rust proof chain is available for all sizes.

Babbitt Adjustable Sprocket Rims with Chain Guide are carried in stock by most mill supply houses. Just phone your mill supply salesman, or contact us direct.

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STEAM SPECIALTY CO.

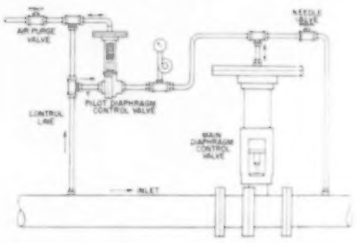
3 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.

New Product Briefs (Continued)

and is equipped with 5 amp contacts for up to 220 volts. A photocell operates the relay when at least 10 foot-candles of light enters the lens and releases when most of this light is removed. Operation may be obtained from a 100 watt lamp at a short distance or from projector LP1 to distances up to 25 feet. Relay operation is within 0.1 second.

Back Pressure Regulators

A-19 Sliding gate back pressure regulators in 4" and 6" sizes are now available from **OPW-Jordan,** 6013 Wiehe Road, Cincinnati 13, Ohio.



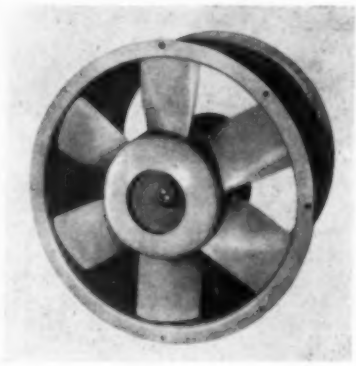
These new line-operated valves have capacities of 50,000 lb of steam per hour or 2500 gpm of water. Sliding gate and plates used in both the pilot and main valve give accurate regulation, tight shut-off and minimum maintenance. The self-lapping and self-cleaning seats cut costs and provide better control over plant operations. The entire system can be purchased, or just the main valve and pilot. The system is suitable for pressures to 250 psi wsp and temperatures to 500 F. The main valve is available in cast iron or ductile iron. The pilot is a standard screwed end control valve with special seats.

Axial-Flow Fans

A-20 A new line of axial flow fans for general ventilation, dust and fume removal and similar services has been announced by **L. J. Wing Mfg. Co.,** Linden, N. J.

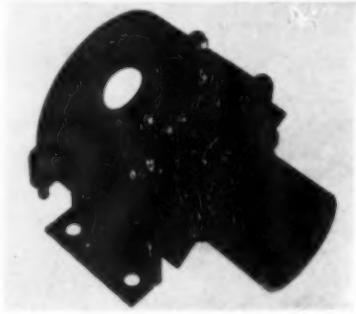
The fans are available in direct-driven and belt-driven vaneaxial types, and direct-driven tubeaxial types for use where air-straightening vanes are not required. Capacities at zero static pressure range from 3220 to 72,500 cfm.

Features include airfoil wheels, flanged heavy-gauge casings, sealed-prelubricated self aligning bearings, and improved capacity per horsepower. A complete choice of motor types is available, and options include aluminum fan wheels, anti-corrosion materials and protective coatings, inlet and outlet cones, and adjustable sheaves for the belt-driven units.



Pipe Guides

A-21 Production of a full size range of pipe guides for aligning and supporting piping in which bellows expansion joints and expansion compensators are used has been announced by



Tube Turns Division of Chemetron Corporation, 224 E. Broadway, Louisville 1, Ky.

The new product, made of carbon steel, consists of a guide spider, to be clamped around the pipe whose movement is being controlled, and a guide casing, which can be bolted to base or other supporting structures at any angle.

The pipe guides are available in two standard models, Series A for up to 1½" insulation and Series B for up to 2" insulation, from ¾" to 30" pipe size. Guides for greater insulation thickness can also be supplied.

Air Conditioning Unit

A-22 A new line of packaged central station air conditioning units, featuring a complete selection of "Better Air" filters, has been introduced by **American Air Filter Co., Inc.,** 215 Central Ave., Louisville 8, Ky.

The Kennard/Nelson units offer a complete central station package where all components, including fans, coils, humidifiers, dampers, filters, frame and casing are designed, fabricated and tested by one manufacturer.

Air filters available include AMERglas throw-away, HV2 permanent cleanable unit filters, and automatic filters such as the automatic renewable media Roll-O-Matic, and the Rollotron, a combination dry electrostatic with the automatic renewable media filter.

The new line is available in both horizontal and vertical models in 14 basic sizes, with 24 different arrangements per size — 500 cfm to 36,000 cfm. Both forwardly curved and backwardly inclined centrifugal fans are offered against static pressures up to 9.0 inches.

Repair Kit

A-23 **Devcon Corporation,** Danvers, Mass., has developed a repair kit for castings, valves, pumps, patterns, core boxes, molds, and all types of industrial machinery.

The new kit consists of two three-ounce self-measuring tubes. One tube contains Devcon F; the other, hardening agent for Devcon F. The process for making repairs with this kit is simple. Equal lengths of each material are squeezed from the tubes, mixed with a wooden paddle included in the kit, and then applied to the broken casting or part to be repaired. The mixture contains approximately 80% aluminum and 20% improved epoxy resins and modifiers. It does not shrink and exhibits tremendous adhesion to steel, iron, aluminum, bronze, glass and many other surfaces.

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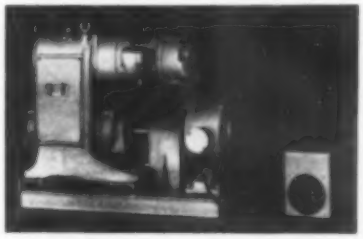
Variable Frequency Unit

A-24 **Georator Corporation,** Fairview Road and Tudor Lane, Manassas, Virginia, announces the availability of its new variable frequency source unit, originally developed for testing 400 cycle components for operation over a wide range of frequency and voltage.



Standard frequency range of the unit is 380 to 420 cycles, with voltage variable between limits of 105 and 125 volts, three phase, line-to-neu-

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tral (182 to 217 volts line-to-line).

Operating from a standard three phase 60 cycle input, output is three phase, four wire, 5 kva. The combination of a "NoBrush" alternator and typical "NoBrush" brushless construction render both regulator and exciter unnecessary. Variable ratio pulley drive and auto transformer on output, both manually adjustable, make possible any desired combination of voltage and frequency within the machine's range.

Designed for research and testing of high frequency equipment, comprehensive ratings are available between .60 kva and 25 kva. Units are also available with greater than standard ranges.

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FOR WATER *Softening* AND *Conditioning* . .

STRONGLY ACIDIC -STRONGLY BASIC TWO-BED DEMINERALIZER

Pictured above is a large heavy duty demineralizer with solo valve manual control, located at a Florida Air Force Base.
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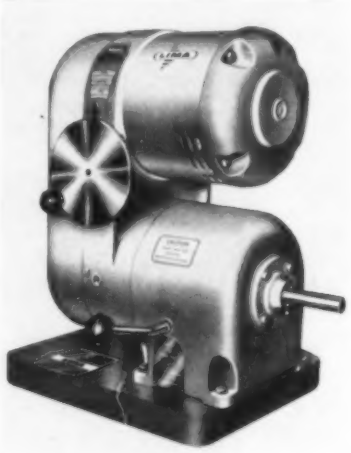
All types of Domestic, Commercial, and Industrial Water Softening and Conditioning Equipment. Filters - Taste and Odor Removers - Aerators - Demineralizers - Zeolite, Ion Exchange Minerals in stock - Residential and Commercial Package Swimming Pool Filters - Also Rebuilding and Modernizing.

Southern Water Conditioning, Inc.
301 15th Avenue South
St. Petersburg, Florida

Variable Speed Drive

A-25 **The Lima Electric Motor Co., Inc.**, Lima, Ohio, a subsidiary of Consolidated Diesel Electric Corporation, announces the availability of a new variable speed drive.



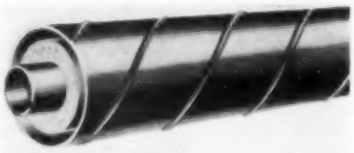
Every rpm between 180 and 1800 is obtainable from this new unit, when an 1800 rpm motor is incorporated. Using a 1200 rpm motor all speeds between 120 and 1200 are available. Either drip-proof or totally enclosed fan-cooled units can be furnished, in ½, ¾ or 1 hp.

The incorporation of a four speed transmission results in three times greater torque at the low speed. A simple control wheel regulates the output shaft to the desired rpm. A pointer indicates on a calibrated speed plate, the exact rpm at which the output shaft is turning.

Piping Systems

A-26 **Ric-WiL, Incorporated**, Barberton, Ohio, has developed a new, prefabricated piping system for the overhead distribution of steam, hot water, process liquids and refrigeration lines, called Plasti-clad. It consists of the pipe and insulation covered with aluminum foil, over which are two wrappings of fiberglass cloth integrated within the Plasti-clad material. A final color coat is applied to finish the unit.

The new Plastic Coated system for underground distribution (illustrated) consists of pipe and insulation covered by a spiral welded metal conduit. The conduit is protected against soil and stray current corrosion by a 20 to 25 mil cold-cured epoxy coating. The coating is reinforced with fiberglass cloth. It is highly resistant to acids, alkalis and



salts. The material has a high dielectric strength and will withstand a 10,000 volt spark test. The coating is resistant to continuous temperatures of 375 F and does not crack or cold check at low temperatures. Thermal coefficient of expansion is nearly the same as steel so that expansion and contraction of the conduit will not rupture the coating. All units are factory prefabricated in sections as required by job conditions. Joints are field welded and material is supplied for making final closures after testing.

Submersible Pump

A-27 **Kenco Pump Division**, 1305 Oberlin Ave., Lorain, Ohio, has announced the new Model 119-A44 heavy-duty submersible pump designed to protect underground transformer installations.

This special pump has a cast-bronze housing and an oil-filled, completely sealed ½-hp motor that delivers a pumping capacity of 3,300 gallons per hour at a 10-foot head. Its 2-vane non-clog impeller can handle solids as well as liquids, including popsicle sticks, cigarette butts, candy wrappers and other objects that fall through transformer vault grates and must be removed together with the drainage and ground water. A special 3½" opening in the strainer base assists the non-clog operation.

An exclusive diving-bell arrange-

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ment of the pump's separate breather control traps air in its skirts as the fluid level rises. Pressurized air forces the nylon-neoprene diaphragm, protectively enclosed inside the separate control, to flex and close the switch contacts starting the pump. Thus the water is removed before it can damage the

transformer and other critical equipment.

To further protect the pump from flooding and eliminate shoring of the power cord, this model can be installed with a protected connection of the power cord into a watertight box. Produced for 115-volt and 230-volt operation, it is equipped with either a 10- or 20-ft integral-molded thermoplastic power cord and cap.

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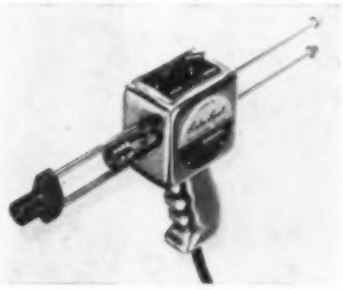
Arc Welding Gun

A-28 **Bren Weld Corporation,** 5114 Third Ave., Brooklyn 20, New York, announces a new patented automatic arc spot weld gun, which welds from one side.



This Model 90 is simple because by merely pressing against the work, the arc starts and the electrode is fed automatically. When the welding operation is completed the gun shuts off, and it is automatically reset and ready for the next weld. It welds all kinds of sheet metal from a minimum 26 gauge to a maximum 12 gauge.

The gun weighs only 2 pounds and comes complete with its own power supply.

Metal Parts Cleaner

A-29 A new low cost method of cleaning small metal parts is now possible with the metal parts chemical cleaner manufactured by **Pall Corporation,** 30 Sea Cliff Avenue, Glen Cove, New York. It is effective not only on parts of simple configuration, but is equally applicable to parts which have unusual or convoluted shapes, such as the inside of tubing and small holes in complex shapes.

Stainless steel, brass, aluminum, carbon steel, nickel and nickel alloys

(*Continued on page* 80)

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Another wrote, **"Before trying Kroil on heat treat trolleys, we broke off every nut . . . since then we have not lost one."**

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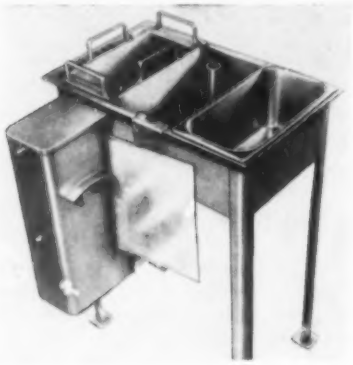
New Product Briefs (Continued)

and other materials can be finished to a bright surface. The cleaner will remove encrusted carbon, weld ox-



ides, brazing flux, varnish and paint. It contains no moving parts or electronic tubes. Cleaning is performed with solutions which contain effective chemicals and detergents.

For more Free Data FILL IN CODE NO. on the Handy Return Card — Page 65

Fastening Tools

A-30 **Ramset Fastening System,** New Haven, Conn., has introduced the new heavy-duty Shure-Set R-450 hammer-in

fastening tool.

The tool has a special offset handle to keep the worker's hand away from the striking surface, and to enable him to set studs more easily in hard-to-reach places. Both the R-450 and the standard Shure-Set models set pins or threaded fasteners into concrete, masonry and thin steel with a couple of hammer blows.

Ramset is part of the Winchester-Western Division of Olin Mathieson Chemical Corp., 460 Park Ave., New York 22, N. Y.

Diaphragm Relief Valve

A-31 A super-sensitive diaphragm relief valve for service where corrosive chemicals are a problem is now available from **Farris Engineering Corporation,** 630 Commercial Ave., Palisades Park, N. J.

The 1000 Series diaphragm relief valve provides a vapor tight seal to prevent leakage and eliminate waste. The valve's spring and guides are isolated from the process fluid to avoid corrosion problems. It is available in a wide choice of materials. Sizes are from ½" to 2". Cap construction includes plain, packed and open lever types. Connections are screwed or flanged. It may be mounted in horizontal or vertical position.

REPRINTS of the special Water Treatment section (pages 21-32) are available — Write the Editors.

STOP CORROSION NOW!

FIND OUT HOW...

• If you have *any* corrosion at your plant, stop it *now* before replacement costs eat gaping holes in your profits!

Chemfast Coatings

BAR-OX BARS OXIDATION

SPEED REX with DEVRAN Epoxy Resin

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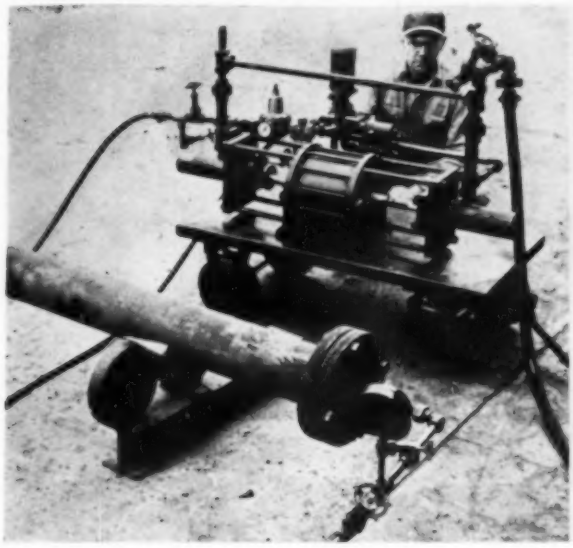
New Orleans, La. — 3408 Purdue Drive, Vernon 5-1100

Fig. 1 Below — Maintenance employee at Union Carbide Chemicals Co. tests a length of transmission pipe at over 300 psi.

Fig. 2 Right — The easily transported air-driven hydraulic pump speeds pressure testing of large capacity vessels in processing plants.



Pressure Testing Speeded By Portable Pump Rig

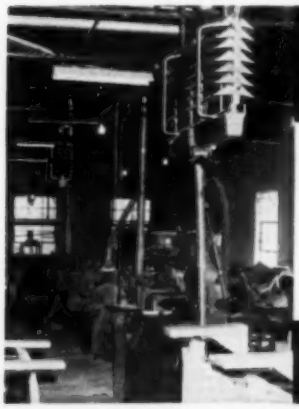
PRESSURE TESTING of process equipment at Union Carbide Chemicals Company is speeded with a portable hydraulic pump rig. Maintenance workers at the company's South Charleston, W. Va., plant designed the unit.

The rig consists of a horizontal air-driven hydraulic pump mounted on a rubber-tired cart. The 7,330 psi pump, manufactured by the Aldrich Pump Company, operates on 90 psi plant air. Operation is quiet and virtually free from vibration.

The rig is used for pressure testing pipe, heat exchangers, tanks, coils and special pressure vessels after fabrication or repair. While much of the testing is done in the welding shop, the unit's portability enables the pump to be used at locations throughout the plant.

The company reports that the pump provides fast, efficient testing of equipment. In testing large capacity vessels particularly, the desired pressure is attained much faster than formerly. Pressure testing of piping (300 psi and up) is also completed more rapidly.

Maintenance, which takes place every six months, is a simple operation. The pump is merely cleaned and lubricated and any foreign matter is removed from seats.



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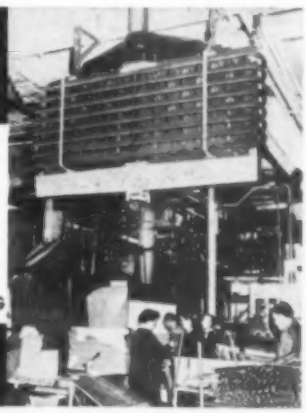

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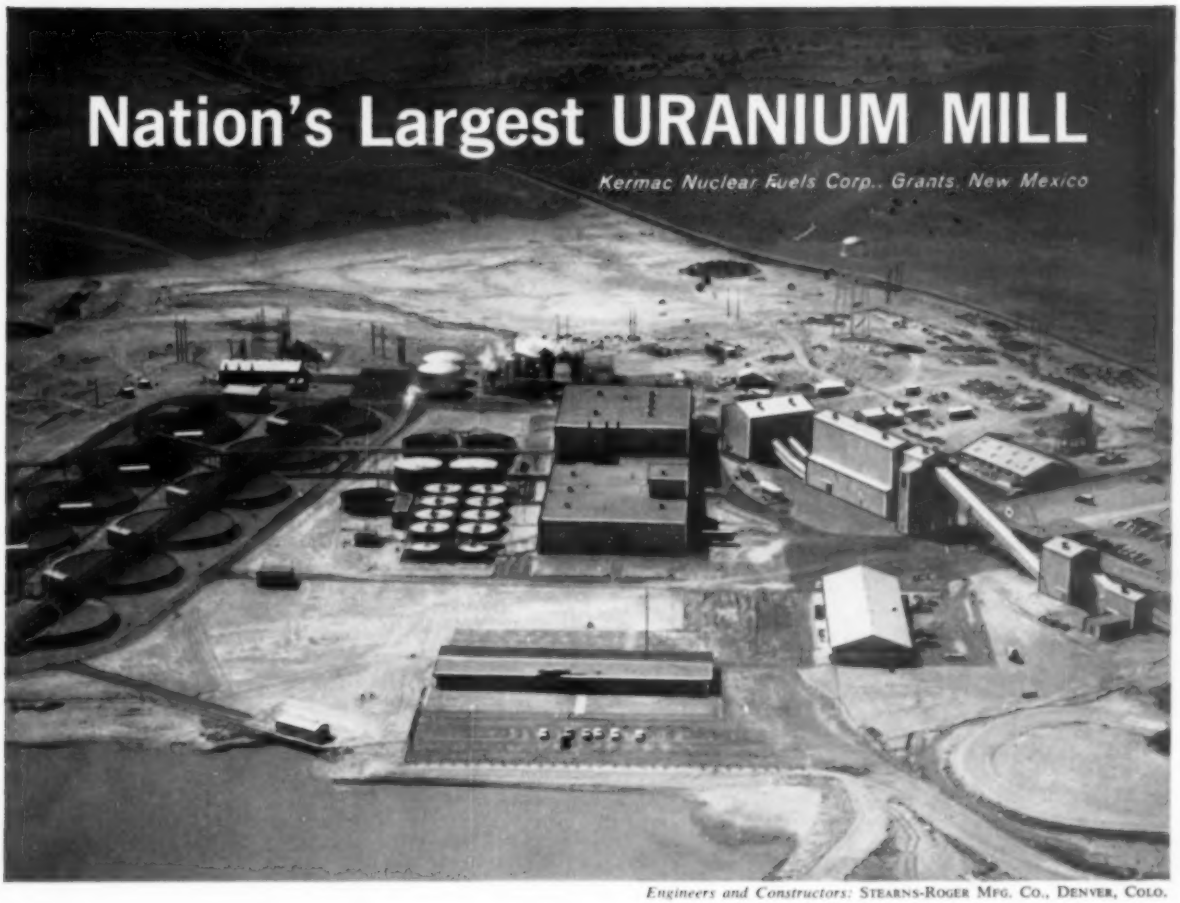

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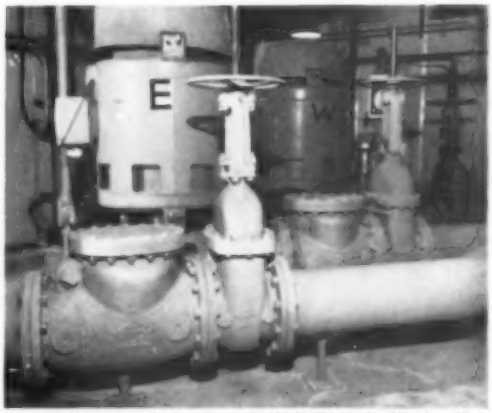

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